The Builder.

AN

ILLUSTRATED WEEKLY MAGAZINE,

FOR THE

Architect, Engineer, Archæologist, Constructor, & Artist.

CONDUCTED BY

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"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."——SIR HENRY WOTTON.

"Our English word TO BUILD is the Anglo-Saxon Býldan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."——DIVERSIONS OF PURLEY.

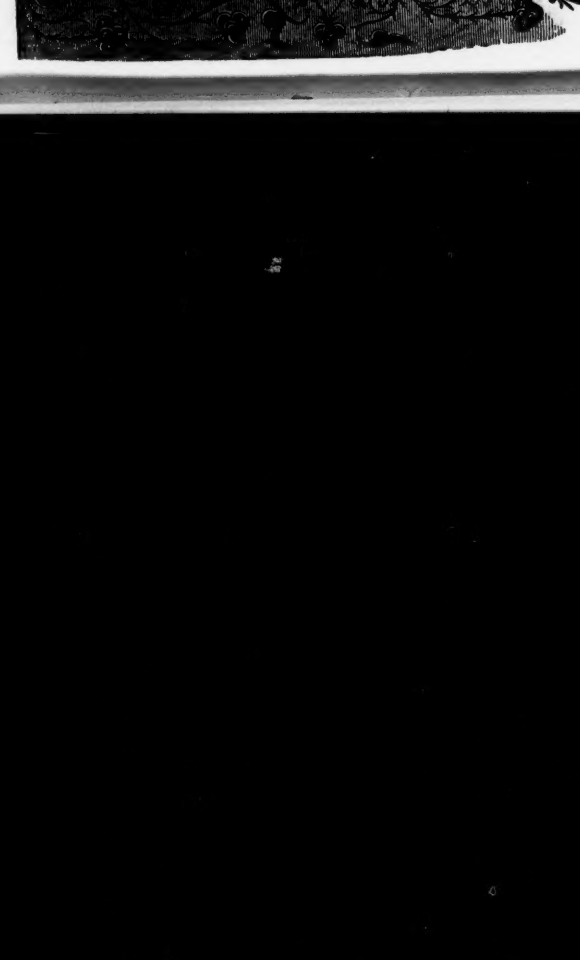
"Art shows us man as he can by no other means be made known. Art gives us 'nobler loves and nobler cares,'—furnishing objects by the contemplation of which we are taught and exalted,—and so are ultimately led to seek beauty in its highest form, which is GOODNESS."

VOLUME FOR 1859.

LONDON:

PUBLISHING OFFICE, YORK STREET, COVENT GARDEN.

Our



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The Builder.

Our Last Volume.—Theatres.—Drinking Fountains.

IN the volume we completed last week, besides inquiry into the present condition of architecture amongst us, sanitary investigations, the drainage question, the condition of our barracks, the modern architecture of France, and a running exposition of new processes and materials important to all engaged in building operations or interested in them, it will be found that the arrangements of Hospitals and Theatres, the defects known to exist in those we have, and the improvements required in such as may be hereafter built, have been treated of at more than ordinary length, though not by any means for the first time. In respect of both we have reason to believe that these endeavours have not been without advantage to the public, and will continue to produce good fruit. Some curative establishments now in progress have been designed, admittedly, in accordance with the opinions set forth in these pages; and there is reason to expect, that greater intelligence will be brought to bear on the subject in planning any future hospitals than has exhibited itself heretofore in such structures. So, too, with theatres, where there still remains so much to be done before we shall have an edifice perfectly appropriate, safe, convenient, and beautiful. The requirements made in our pages, particularly in respect of staircases and approaches, have been thought unnecessarily large and too stringently demanded: and now comes another appalling catastrophe, on the gallery staircase of the Victoria Theatre, to show their correctness and to enforce the warning we have given to the managers of other places of assembly. Every reader has probably heard by this time that on Monday last—"Boxing-day—"while the gallery of the theatre in question was filled with 800 or 1,000 people witnessing a morning performance, a crowd was most improperly permitted to fill the staircase in waiting for the evening performance; that some trifling occurrence, whether it was the ignition of fusees in the pockets of a youth in the boxes, or an escape of gas on the staircase, produced a cry of fire and "a panic" (the old story); that a rush to escape was made by those above, was resisted by those below, and that in ten minutes sixteen boys and youths were killed, and many more injured for life! In ten minutes! Just think of it. And imagine a similar panic at Exeter Hall or on the stairs of the Surrey Music Hall, although somewhat improved since we foretold the sad accident which did happen there, or in half-a-dozen other places that we could readily name, and see what would be the result. The staircase at the Victoria runs up the sides of a large shaft in easy flights round a small well-hole. The stairs are apparently about 5 feet 9 inches wide, have a strong wooden balustrading and an iron hand-rail against the wall. It is stated that on such occasions, way of egress for the audience already in the house is afforded by means of a staircase to the boxes, but it ought to be perfectly well known by this time to all connected with public buildings, that it is only those appliances which are in constant use that can be reckoned on in such emergencies.

It seems that the Examiner of Plays, under the Lord Chamberlain, is also Inspector of Theatres, and makes official examinations of such buildings. It is time that he took to his assistance some competent architect, and enforced, if he have the power, some improvement in a matter on which so much depends. A proper inspection, indeed, ought to be made compulsory under an Act of Parliament, which should contain clauses requiring entrances and accesses of proper form, and of size proportioned to the number of persons who may be expected to congregate.

In the public buildings of many provincial towns the danger referred to exists; and we have recently received statements to the effect that the restricted means for entrance and egress in the two public halls in Edinburgh render the occurrence of accident there more than likely.

The positively *best* arrangement of staircases for the use of large numbers of persons, liable to panic and dependent on the behaviour of others, has yet to be determined on. We have asked for, at all events, a larger number of them, in proportion to the number of persons accommodated, than are now provided; in short flights, not too wide, with good landings, no winders, and a handrail on both sides.

Even where the provisions are not in themselves bad, want of thought is oftener seen to prevail and produce evil results than might be expected from men long connected with places of public amusement. On the first night that "Satanella" was performed at Covent-garden Theatre, a fortnight ago, the visitors to the pit, who had congregated under the portico to the number of several hundreds before the time for opening, were admitted by one small door only, although there were several available, and the crowd swayed backwards and forwards, as the pressure to the right or left of the opening was greater, to the serious inconvenience of those composing it, many of whom, doubtless, determined on never risking a repetition of it. A few barriers, so as to form a narrow *queue*, would prevent all this, and Mr. Harrison has shown himself on another occasion so alive to the value of good means of entrance and exit, that probably, if the same course be still pursued, this intimation will suffice to lead him to improve upon it. At the French theatres, vast numbers of eager visitors are admitted without any inconvenience but that of waiting; and why should it not be so here?

At the opening of the new Adelphi Theatre, on Monday evening last, great confusion and difficulty were caused simply by the omission of a dividing barrier down to the footpath, to separate the unfortunately restricted approach to the boxes and stalls from that to the pit. The result was, that those who desired to get to the latter choked up the lobby; and there was a long string of carriages stretching away towards Charing-cross, and filled with those who were provided with tickets, but who were unable to obtain admission before a clearance was effected. In the arrangement of accesses to public buildings, and modes of admission and egress, provision should always be made to meet the worst possible case.

Under the present Building Act the district surveyors have considerable power over the plans of public buildings, and should use it; although, considering the way in which they are often thwarted by the police magistrates, it is not surprising if they avoid making any requirement that is not clearly called for by the Act. An example of the way in which they are positively prevented from performing their duties will be found in our present number. Another instance of the difficulties thrown in their way occurs to us. Not long ago a district surveyor summoned a builder to the Clerkenwell Police Court, and, acting with a recollection of what had occurred there on a former occasion, he took a summons for each house, for which, by the way (eight at 2s. each), as the builder ultimately failed, the district surveyor had to pay, besides losing his debt in spite of the magistrate's order. But, when the case came on for hearing, the magistrate expressed surprise that the whole had not been included in one summons, and intimated that expense had been incurred unnecessarily. On the next occasion, therefore, a fortnight or so ago, when the same district surveyor had occasion to summon some builders for similar fees at the same Police Court, he gladly availed himself of the observations that had been made; and, where several houses built by the same man at the same time came together, he included them in one summons. But another magistrate sitting when the cases were heard, the result was, that he positively refused to issue his order for more than one house in each case (notwithstanding the builders had no objection to make to the claim excepting asserted inability to pay at the time), though he offered to adjourn them, the surveyor's time being apparently thought of no value, in order that the other magistrate might adjudicate differently, if he chose. It is quite time that the district surveyors had another tribunal to look to, and the reports of decisions under the Building Act, which we shall continue to give (several will be found in our present number) will probably lead to this one of these days.

In addition to the few more salient subjects to which we have already referred, we have sought to urge forward the Street Fountain movement, as well because the erection of such conveniences may be made to afford architects the opportunity of adorning our highways, as because of the want they supply, and that they lessen the attraction of the beer-house and dram-shop. Up to the present time very little variety or skill has been shown in those set up. The utmost that can be said of the best of them is that they are not offensive. We shall endeavour to aid in improving them. Mr. Gurney, as we have already mentioned, has munificently determined on setting up four fountains at his own expense, including one against the wall of St. Andrew's Churchyard, Holborn (a bad place, as it will deter many from drinking the water), and one in a central position at th Circus, in Piccadilly, surmounted by a lamp. The latter will be of metal, the former of polished granite, and white marble. It might seem ungracious if we commented

on designs in embryo confidentially submitted to us. We must, however, go so far as to remind Mr. Wakefield and others who are kindly aiding Mr. Gurney to carry out his views, that these fountains, once put up, will, without doubt, remain during the whole of their lives, to say nothing of posterity, either to delight or pain them, and will exercise an influence, for good or evil, on the taste of large numbers of persons,—and they will then, perhaps, see that a little further advice as to design may be useful. Mr. Gurney has also headed a subscription to place a fountain in the Royal Exchange. It is proposed that this should take the shape of a female figure. In all these the water (filtered) will run continuously in a small stream. The cups are to be of thick glass, or of iron, enamelled.

AN ACCOUNT OF THE WHOLE SCHEME OF METROPOLITAN MAIN DRAINAGE.

IT is not to be expected that all our readers should be exactly informed as to the details, or even the plan, of the works to be undertaken for the drainage of London, though it may be known from particulars we have given, that main sewers on each side of the Thames, at various levels, will run parallel, so to speak, with the course of the river, and then converge in either case into one outfall-channel, which will be continued to Barking Creek at the north, and to near Crossness-point, in Erith marshes, on Halfway Reach, somewhat lower down, for the south,—that the object in planning these sewers is both that sewage may be intercepted, so as not to pollute the river within the thickly-populated district, and that the rain-fall from the upland districts be prevented from flooding the low-levels and dwellings there situated; that, moreover, to get the low-level sewage into the main outfall-channels, recourse must be had to pumping; as well as that storage in reservoirs at the points of outfall during certain hours is essential in the scheme; that some process for "deodorizing" will be applied at the outfalls occasionally or as required; that the sewage of the "western division" (including Hammersmith, Fulham, part of Chelsea, and the land bordering the West London Railway), like that of Shadwell, the Isle of Dogs, and the district of the Victoria Docks, is to pass into the Thames, for the present at least, but deodorized, probably; and that whilst the new sewers are designed to divert the whole of the tributaries of the Thames within the metropolitan district, to a lower point as mentioned, the system requires the provision of certain outlets to the Thames and the Lea for occasional emergencies on days of excessive rain. But as regards the *routes* of the sewers, as well as the structural details, precise information has not been available. When we noticed the Report to the Metropolitan Board of Works,* which it seems is to be acted upon, there were no plans attached; and our recent particulars of the northern high-level sewer† were compiled under disadvantages of which doubtless the article itself disclosed evidence, so far as regarded the elaborate contrivances at the pen-stock and overflow chambers and storm-outfalls. These omissions we can supply now or shortly: the information as to the general character of the whole of the intended works of metropolitan main drainage, we proceed to give by way of preface to the notices severally of those portions of the work on both sides of the Thames forming the eleven contracts, as intended; which notices, the commencement during the present year of all or nearly all of such portions, will require us to furnish, and which thus, we hope, each will be understood, as to their larger relations. The tenders for the first portion of the works as received, will be found under the usual heading. It seems that the sixteen tenders for the high-level sewer ranged from 270,000*l.* downwards to 152,450*l.*; whilst the rough estimate previous to the completion of the detailed drawings, but "including land, compensation, and a variety of contingent items," was 150,000*l.* The rough estimate for the whole sewerage of London was 2,131,000*l.*

Endeavouring, then, to comprehend the general scheme of metropolitan main drainage, and leaving the "western division," and the exceptional areas before mentioned without notice,—further than that the first-named portion, expected to cost 55,000*l.* is dependant upon arrangements to be made this year as to deodorization,—the intended main sewers are divided on the north side of the Thames into "high-level," "middle-level," and 'low-level" sewers, and on the south side into "high-level" and "low-level" sewers. Each of the "main" lines, however, has one branch, or more than one. Thus, the "main low-level sewer" on the south side, being planned to run south of Kennington, and along part of the Old Kent-road to Deptford, a "branch" is required for Bermondsey, which last continues along the Deptford Lower-road, and might be considered as a distinct *main* sewer. Also, the "Wick-lane branch" spoken of in our article on the high-level sewerage, may be instanced,—though we should explain that in that case, the junction with the storm-outlet channel of the portion of the system about being commenced, is only provisional, and that the "branch" will ultimately be continued by the "drop under the invert" of that channel, southward, past the Eastern Counties Railway and Stratford-le-Bow, to a point near Bromley-bridge, there to fall into the "main low-level sewer." The points of convergence of the whole system in each case, are these:—on the north side a spot at Abbey Mills, near Abbey Creek, and the Channel Sea River (the latter the most easterly of the several branches of the Lea); and on the south side a spot by the Ravensbourne, between Deptford and Greenwich. About each of these points, also, will be the station for pumping the low-level sewage to the high-level. Accurately speaking, perhaps we might say, there will be only two lines converging at the pumping station, north as well as south of the Thames, since, although, as will be shortly explained, there will be two channels for the high and middle level sewage, north side, up to the junction of the low-level sewer at the pumping station; the middle-level sewage will join with that of the high level at penstock and overflow chambers (mentioned in our former account) which communicate with each other, or are so contrived that one sewer may afford relief to the other. The parallel course of the two sewers to the pumping station, and inclusive of the penstock and overflow chambers at the commencement of that course, is not much short of 1 mile 600 yards, the branches of the Lea being crossed askew. On the south side, the Bermondsey Branch after running southward along High-street, Deptford, joins the main low-level sewer on plan where the latter intersects High-street at a point just south of the railway, the high-level sewer also running there not far distant, or along the New-cross and Greenwich road.

From the point of convergence, already named (near Abbey Mills) on the north side, the outfall for the combined sewage has to be continued, mainly above the natural level, or in a constructed embankment. It is therefore convenient in place of one sewer, to continue three lines or channels side by side—each channel 9 feet in width by 9 feet in height—rather than to have a single sewer equivalent to the three in sectional area. By the embankment also, the sewage arrives at the point of outfall, at a high level, or one by which it can be ejected into the reservoir, or the Thames, as the case may be, under the most favourable circumstances. On the south side, on the contrary, the sewer has to be altogether below the natural level, and therefore pumping must be resorted to at the reservoir and outlet into the Thames. This pumping for the whole sewage of the south side, is additional to the pumping at the Ravensbourne, so far as the low-level sewage is concerned. The last raising would amount to 25 feet. The sewer, however, being below the existing ground, and being required for a smaller volume of water than that of the north side, is designed to be but 11 feet 6 inches in diameter. The total length of the outfall-sewers respectively is on the north side, from the crossing of the North London Railway to Barking-creek, five miles and three quarters, of which distance the portion in two channels may be considered as one mile and a third, the three lines from the pumping station being the remainder of the length; whilst, on the south side, the distance from the point of convergence seems to be seven miles and a half. The inclination intended in both cases is 2 feet per mile. The embankment over the northern outfall line will form a roadway 40 feet in width, including the footpaths; and the sides will be laid to a slope of 1½ to 1. We have said that the northern outfall sewer would be in an embankment, or mainly so: we should say rather, that a length of somewhat less than two miles west of East Ham and Barking roads, will be just below the present surface of the ground. Brickwork will be adopted in the case of both outfall lines,—or in that of the northern outfall, in lieu of the iron piping which had been proposed by Mr. Bazalgette; and the three channels will be of form suited to construction in the embankment; whilst the southern outfall line will be a single barrel-sewer everywhere alike except in the thickness of the brickwork, which varies from 1 foot 10½ inches to 18 inches, and as to the concrete externally, or other details of construction, which must be governed by the nature of the ground. The invert of the outfall sewer—north side—appears to commence at about 9 feet above Trinity high-water mark, and to fall to about 2 feet 6 inches below it, or at the outlet; whilst the southern outfall sewer appears to begin with 13 feet 6 inches below the same level, and to incline to 27 feet below it. On the northern side the quantity of sewage to be received by reservoirs, has been estimated at about 14,000 cubic feet per minute for six hours of the day, and about 4,700 feet per minute on the average for the remaining eighteen hours. The area for the reservoir would be about twelve acres. On the south side, for the like period, as stated by the report, the respective quantities of sewage will be about 8,000 feet and 2,700, and the area of the reservoir about seven acres. The reservoirs would be arched and turfed over. It may be recollected that by the reporters to the Board of Works, these reservoirs were not considered as absolutely required—considering the volume of the river at that part of its course, and the comparatively innocuous state of the sewage when it had reached such distant point; but they would be favourable to the treatment with lime, or other process of "deodorization." The mean sectional area of the river between Barking-creek and Crossness Point was stated as "four times as great as at London Bridge, and the average volume of tidal water about four hundred times as much as the volume of the sewage water to be admitted into it." The river, also, was regarded as fresh, or nearly so, at low water, and at high water as only moderately impregnated with salts—compared with the water at any alternative point lower down; and other objections were offered to any lower point. An outfall at Greenwich Marshes was even preferred, as avoiding the expensive construction of the sewer through Woolwich, and as considered to attain all sanitary objects. We should state, that it is proposed to discharge the sewage from the reservoirs, during the first hours of the descending tide, by pipes submerged, or terminating below low-water mark.

The advertisement lately in the newspapers giving notice of works, refers, first, to the ground west of the Lea which will be occupied by the penstock and overflow chambers, and other portions of the high-level sewerage in the first contract,—or commencing from a point about 300 feet west of the crossing of the North London Railway,—from which point, up to the Lea, the sewer being in an embankment, will involve the raising of the thoroughfares, for about 400 feet of their length northward, at an inclination of 1 in 30, and for about 300 feet of their length southward, at an inclination of 1 in 25; and secondly, the advertisement refers to ground on the east side of the Lea, its western branch, and betwixt and beyond the other branches, passing under the Eastern Counties Railway, and by the intended pumping station at Abbey Mills, across Channel Sea river, and up to the North Woolwich Railway, which second portion of ground on the line of the outfall sewer is required at once for the deposit of earth, or somewhat prior to the construction there of the sewer. The whole of this work—belonging to northern outfall sewer—it will have been understood, is included in the work for which tenders have just been received, though the remainder of the earthwork to Barking Creek, and the whole of the brickwork of the main outfall sewer, and the aqueducts over the branches of the Lea, are not expected to be tendered for till after April next.

In the course of the outfall sewer on the north side, the two-channel line, after branching out from the line which is the subject of the first contract, will cross seven different streams or portions of the Lea,—that is to say, it will cross the western branch, usually known as the Lea, by an aqueduct, and according to the terms of the Act as to 8 feet 6 inches headway; then a stream belonging to the East London Water-works Company, whence it will reach the Puddling Mill river, crossing it. After passing under the Eastern Counties Railway, it will cross the City Mill river, and next the Water-works river, otherwise called Three Mills river. The line of the Stratford High-road is next reached, which road will have to be raised, to pass over the sewer, the work involving the purchase of several houses and wharfs; and the sewer will then cross Abbey Mill-lane, to be lowered as may be required. The outfall

*See p. 254, *ante*. † See p. 789 *ante*.

sewer, having taken in the low-level sewage and become three channels, will cross Abbey-creek and Channel Sea river and the intervening ozier-beds, and reach the North Woolwich line, as before mentioned. The several aqueducts crossing the streams will be probably of iron pipes. In contradistinction to the chief part of the line of the High-level sewer, which has been described as passing in great part along existing roads and streets, the outfall sewer will pass, we might say, wholly through land now in the hands of private owners or companies, as indeed the notice shows. The pumping station will be formed on land between Abbey Mill-lane and Abbey-creek. The low-level sewage would be raised there a height of about 34 feet. The portion of the outfall sewer described includes, it may be supposed, a considerable amount of work in arching over drains and water-courses which are under the jurisdiction of the Commissioners of West Ham and Plaistow Level. The total quantity of land required for which notice is now given is twenty-nine acres.

The North Woolwich line is to be lowered to pass under the sewer; and, extending beyond it, the sewer intersects the Bow and Barking Railway (which is to be raised to pass over the sewer), Plaistow-lane, Palsy-lane, Green-street, Barking-road, East Ham Manor-road, and Jenkins-lane,—each of these also to be raised. The northern outfall-sewer, just described, the tenders for which were expected to be advertised for in April next, has been estimated to cost 464,000*l.*; whilst the reservoir at the outfall, for which the tenders were to be advertised for in July next, was expected to cost 150,000*l.*

The outfall sewer on the south side, fortunately may be taken to the eastern extremity of Woolwich along existing streets and roads. Commencing with the junction of the sewers from the high-level and the pumping station, or about the middle of the Greenwich-road, it will pass along London-street, Nelson-street, by Greenwich Hospital, Trafalgar-road, the Greenwich and Woolwich Lower-road—intersecting the river-side branch of the railway,—Albion-road, Woolwich; George-street, Church-street, Church-yard, Powis-street, Beresford-square, and to the turn in the Plumstead-road, whence it passes across the Plumstead-marshes to the outfall in Halfway-reach before mentioned, between the Powder-magazines. The sewer was expected to cost 372,000*l.*; and the drawings were to be ready in June next: the reservoir was to cost 90,000*l.*; and the drawings were to be ready in July.

Reverting to the main sewers of the different levels, before the junction into the single outfall,—on the north side we have already described the course of the high-level sewer. The line of the main middle-level sewer on the same side may be traced upwards, and from its junction with the high-level sewer, first southwards for a short distance, then along Old Ford-lane, formerly known as the Drift-way, across the Regent's Canal, and along Green-street, Globe-town; the Bethnal-green-road, and Church-street, to Old-street at St. Luke's Hospital, and thence by Clerkenwell-green, Back-hill; King's-road, Gray's-inn; Hart-street, Bloomsbury; Oxford-street, and the Uxbridge-road, or north of Hyde-park and Kensington-gardens; and beyond the latter, northward by Denbigh-street and Portobello-lane to the edge of the jurisdiction, near to the London and North-Western Railway. A portion of the line will be formed with the new street designed to effect a junction between Oxford-street, Old-street, and the Bethnal-green-road. The main line is to have two branches, "Aldgate Branch" and "Piccadilly Branch," the former passing out of the main line southwards from Green-street, along West-street, Devonshire-street, Ducking-pond-row, Princes-street, and other streets which are parallel with the Whitechapel-road and north of it, to the end of Wentworth-street at Petticoat-lane. The Piccadilly branch will start south-westward from the junction of King's-road with the Gray's-inn-lane, and pass across Gray's-inn-gardens to Holborn, at the end of Red Lion-street; whence it will intersect the north-west angle of the garden of Lincoln's-inn-fields, will cross Drury-lane and Covent-garden, passing, we believe, along Duke-street and Little Russell-street to the end of Chandos-street, St. Martin's-lane, from which last point it will run north-westward to the eastern end of Coventry-street, finally reaching along Piccadilly to near the commencement of the Green-park. This branch, it will be seen, must involve some difficulties of construction, and interfere considerably with private property, as will the construction of the whole middle-level sewerage with important traffic in the streets. The middle-level sewerage has been expected to cost 214,000*l.*; and the tenders it was expected, could be advertised for in March next.

The difficulties of the middle-level, north side, however, cannot be so great as those of the low-level sewerage, since a considerable portion of the low-level sewer must run in the embankment—which we might have referred to as proposed by the advisers of the Metropolitan Board as means of assisting the removal of the present nuisance; though the cost of the *sewerage* only is included in the 221,000*l.* roughly estimated for the low-level, and though the embankment is not yet decided on,—the question of such embankment even being, perhaps, still *sub judice*. The main low-level line extends south-westerly from the pumping station, along Devon's-lane, intersecting the Bow and Barking and the Dock railways near where they also intersect, and being joined by the "Wick-lane Branch," as already described, and also by the intended Isle of Dogs Branch, which branch, running beside the Dock Railway, or southward, however would not extend, as a chief sewer, so far even as the Blackwall Railway; whilst the main line continues from Devon's-lane, for a short distance along the Commercial-road, crossing the canal and the North-London Railway, immediately after which it turns south along White Horse-street, and then continues again east along the New-road or line of streets leading near Well-close-square, to Rosemary-lane and Tower-hill, whence it runs along Lower Thames-street to the west side of London-bridge. Here the intended line of embankment commences, and the sewer would continue in it to Scotland-yard, to take the "Victoria sewer," or that line which, passing along Parliament-street, reaches to some distance along Belgrave-street, Pimlico. The line is joined in Parliament-street by the "Penitentiary Branch," which would pass between the Houses of Parliament and the Abbey to near the end of Vauxhall-bridge, where it would turn up Bessborough-street.

On the south side, the main high-level line, proceeding along the New-cross and Greenwich road to near the junction of the Peckham and Old Kent roads, continues south of the Peckham-road and parallel with it, through Peckham and Camberwell, on to Stockwell by Loughborough-road, and then south-westerly to the Clapham-road, whence it continues along High-street, Clapham. It is joined at Peckham by a straight branch, for the sewage of Peckham Rye and Dulwich. The tenders for this portion of the sewerage were expected to be advertised for in February next; and the works were to cost 203,000*l.*

The line of the main low-level sewer, proceeding from the pumping-station across High-street, Deptford, as before described, intersects the North Kent, and the Brighton and South-Eastern Railways, north of the New-cross and Greenwich road, extends along the Old Kent-road to just beyond the Canal-bridge, where it turns again westward, and passes along Neate-street, and south of Walworth, along Grosvenor-street, and intersects the Kennington and Camberwell road, and the Brixton-road, proceeds by Holland-street, across the Clapham-road, along Lansdowne-road, across the Wandsworth-road, and across the South-Western and the West-end and Crystal Palace lines, just at their intersection, whence it continues along the Battersea-road and York-road, and may be extended through Wandsworth and by Wandsworth-lane to the church at Putney. A storm-overflow is to be provided from the point at the end of Holland-street, down the Brixton-road by Kennington Church, round the Oval and into the Thames, a little above Vauxhall-bridge, following, it seems, in part the line of the Effra brook. This line, it appears, is to be contracted for separately from the Bermondsey branch, which on plan shows as joining it. The intention, no doubt, is, for some portion of the distance near the pumping station, to form the lines one above the other. However, following the intended "branch" from the point of junction in High-street, southward under the railway, and then westward along the Deptford Lower-road, the line is found to extend to a point somewhere about Jamaica-row, or between Rotherhithe and Bermondsey. The work of this branch of the low-level sewer, estimated to cost 60,000*l.* is dependant upon the purchase of land and probable completion of machinery at Deptford Creek, but steps have already been taken towards the speedy completion of the pumping machinery. There would be a storm-outfall to the river from the High-street, Deptford, down King-street. The *main line* of low-level sewer was expected to be tendered for after May next, and the estimated cost was 152,000*l.*

We now trust we have succeeded in conveying clear information as to the character of the whole of the intended metropolitan main drainage works. We have not gone into the question of the accuracy of the calculations as to the capacity of the sewers for sewage and rainfall, or into that of the sufficiency of the system adopted in regard to the ventilation of the sewers, or disinfection of the sewage in the thickly populated districts, but the points just named have received some notice in our last volume, and we still attach great, and, indeed, primary importance to them.

THE FLUE PEDESTAL.

UNDER this title Mr. C. J. Richardson, the architect, has provisionally registered an invention for abating smoke in house chimneys. He proposes to wash the smoke by means of jets of water: it could be applied to every flue in a house, and the soot from the whole of them carried down to the drain. Of course this is aided by a new system of flues: unluckily, however, the quantity of water required is so great that it will prevent the application of the flue pedestal for this purpose to more than one or two flues in a building; but there is another service it performs, apart from its abating smoke, for which he expects it will be extensively used, and which was not at first foreseen. Fully one-half of the heat from our domestic fires passes up the flues, and is lost in the atmosphere. The flue pedestal, Mr. Richardson's design for which we insert, retains the greatest portion of this lost heat. Thus, placed in one of the upper rooms of a house, it becomes a hot-water pedestal, supplies warm water to the room, and moderately warms it by means of the fires in the lower parts or floors of the buildings, &c. Mr. Richardson has been long known to our public, and we shall be very glad to find his invention prove serviceable to him.

LASSUS'S INTRODUCTION TO VILLARD'S ALBUM, AND PUGIN'S "TRUE PRINCIPLES."

THE following communication was addressed by Mr. Darcel to the hon. secretaries of the Royal Institute of British Architects, but it has been thought that by being inserted in our journal "it would have a more immediate circulation than through the medium of the Institute," and we have therefore gladly translated it with that end in view. It will doubtless find a commentator!

In addressing to you the following letter, which Madame Lassus desired to write to the Royal Institute of British Architects, to express her thanks for the interest with which it had regarded her husband's book, "The Album of Villard de Honnecourt," permit me, as the editor of that book, to present, in my own name, some observations to the Institute.

These observations relate to a material fact wrongly advanced, as I think, by one of its members. In No. 824 of the *Builder*, and in the paper, "Some Remarks," &c. that you have addressed to M. Didron, I read, sir, the expression of an opinion of Mr. Papworth (fellow) that,—"In truth, all

that is really good in the preface [of the Album] is taken from 'The True Principles of Pointed Architecture,' by Pugin."

I believe, sir, and I am persuaded that if the hon. member had remembered more distinctly Welby Pugin's book when he read the Introduction placed by Lassus at the head of the Album, he would not have mistaken for a copy or imitation of an English book what is quite an original work, and which owes nothing to your illustrious compatriot.

In the first place, I have indicated with too much scruple the sources whence Lassus and myself have borrowed—he to compose his notes, and I to complete and put them in order—to have omitted the name of Welby Pugin, if we had taken anything from him.

I cannot recollect if Lassus possessed Pugin's book; but I can affirm that I have not found, either amongst the papers or the list of works to be consulted, any mention of it. Moreover, although I possess, myself, the translation of "The True Principles," published, with comments, at Bruges, in 1850, it did not occur to me to refer to it, unfortunately, perhaps, during my work. I had read the book on its first appearance; and it seemed to me to be such a superficial criticism (the fault is perhaps due to the translators and arrangers?); its examples of fifteenth-century work chosen to be opposed to a wrongly represented antique had appeared to me to be in such doubtful taste,—that I had preserved the recollection of it as a polemical work, not resting upon any certain foundation, nor likely to be of any value against serious adversaries. Since receiving the accusation of plagiarism, I have again read it, and have not changed my opinion.

If the Introduction by Lassus be compared with W. Pugin's book, the same antagonism to the antique style will certainly be found; but the cause defended is different, and differently conducted.

Welby Pugin extols the fifteenth century, English; we, the thirteenth century, French.

Welby Pugin supposes that the antique temple was in its origin a construction in wood: we do not find it justifiable and worthy of antiquity, except it be constructed in stone. Then we set out from the sincerity of construction that we recognise in the antique temples, to find that the Gothic churches of the thirteenth century are their equals in an æsthetic point of view, and their superiors as respects science, and to note marked with the stamp of thoughtlessness the Roman constructions where the arch is made to yield to the lintel.

Lassus saw, with the introduction of Christianity, the arch freeing itself from this subordination, and developing itself to its highest expression in the thirteenth century, where its functions are employed and utilized with admirable sincerity, art, and beauty.

There is another point on which I must insist, for the memory of Lassus, because it is an honour to his sagacity, and that is the difference in the principle of unity amongst Classic and Gothic works.

In the first the module is variable, and once adopted, it assigns to the building all its dimensions. In the second it is invariable—the module is man. That is to say, in every Gothic monument, whether great or small, all the elements of architecture having, everywhere and always, sensibly the same dimensions, regulated by those of the materials in common use, man finds himself in a known and familiar relation, so to speak, with all these elements, and estimates at first sight the real dimensions of the edifice, according to the apparent dimensions of the parts composing it. In this consists the true originality of Lassus's "Introduction;" and I suppose that if it had not claimed for France the honour of having created and developed Gothic architecture, Mr. Papworth had, perhaps, done him more justice, imitating, in that, Mr. Scott, one of ours, and Mr. Donaldson, though that honourable member be one of the partisans of Classic architecture. * * *

In praying you to excuse this long letter and my importunity, which prove with what interest we regard in France all that is said of us in England, and especially in an association so eminent, by the quality of the persons composing it, as the Royal Institute of British Architects, I beg you to receive the expression of the distinguished sentiments with which I have the honour to be, sir, your very humble and devoted servant,

Paris, Dec. 22. A. DARCEL.

WINNAL CHURCH.—We are asked to state that the geometrical tiles laid in St. Martin's Church, Winnal, were those of the Patent Architectural Pottery Company, of Poole, Dorset.

ON THE GREEK CANON OF THE PROPORTIONS OF THE HUMAN FIGURE, QUOTED BY VITRUVIUS.*

IT has been remarked, that although all nature bears the impress of law, to men in general she presents only a number of detached phenomena: to the diligent inquirer alone, or to those whose mental vision is acute enough to discover some link in the secret chain of her laws, does she gradually unfold all the relation which these phenomena bear to each other. Thus the laws that govern the analogy, or proportion, which the several parts of the human structure bear to each other, although very anciently sought, were probably not entirely discovered, or entirely recorded, till sixty years or more after the birth of Phidias, at which time, Polycletus, a famous sculptor of antiquity, made a statue so exact in all its proportions that it was considered the most perfect model of a full-grown man. This statue furnished the canon or law of the proportions of the human figure, which from that period is said to have been observed by all the sculptors of antiquity.

Part of a canon or record of the proportions of the human figure is preserved in the second chapter of the third book of the "Treatise on Architecture" by Vitruvius, in which book that learned architect treats of the proportion, or analogy, which the several parts of an architectural structure should bear to each other; and enforces his argument by a reference to the human frame, in which he tells us certain affinities exist, which were always observed by the most celebrated of the ancient painters and sculptors. This part of the Treatise is obviously a quotation, probably from the writings of the ancient sculptors or painters then in existence, and most probably from the canon of Polycletus.

I will now proceed to read this part of the third book in the translation by Professor Wilkins, notifying certain variations in an Italian version of the same text by Leonardo da Vinci. "Nature, in the composition of the human frame, has so ordained that the face, from the chin to the highest point of the forehead, whence the hair begins, is a tenth of the whole statue: the same proportion obtains in the hand, measured from the wrist to the extremity of the middle finger. The head, from the chin to the top of the scalp is an eighth, and as much from the bottom of the neck.† From the top of the chest to the highest point of the forehead is a sixth; to the top of the skull a fourth.‡ If the length of the face, from the chin to the roots of the hair, be divided into three equal parts, the first division determines the place of the nostrils; the second, the point where the eyebrows meet. The foot is a sixth part of the height of the entire frame; *the cubit* and the chest are each a fourth.§"

"The other members have certain affinities which were always observed by the most celebrated of the ancient painters and sculptors, and we must look for them in those productions which have excited universal admiration."

"The navel is naturally the central point of the human body; for if a man should lie on his back with his arms and legs extended, the periphery of the circle which may be described about him, with the navel for its centre, would touch the extremities of his hands and feet." With respect to the extremities touching the periphery of the circle, it is clear from the diagram that if the arms be raised above the horizontal, touching the top of the head, or not quite so high as the horizontal, the extremities of the hand will not touch the periphery. So likewise if the legs be expanded beyond the equilateral triangle, or more or less than 60 degrees, the feet will not touch the periphery.

"The same affinities obtain if we apply a square to the human figure; for, like the contiguous sides, the height from the feet to the top of the head is found to be the same as the distance from the extremity of one hand to the other, when the arms are extended."

"The standards according to which all admeasurements are wont to be made are likewise deduced from the members of the body; such as the digit, the palm, the foot, and the cubit, all of which are subdivided by the perfect number which the Greeks call Teleios."*

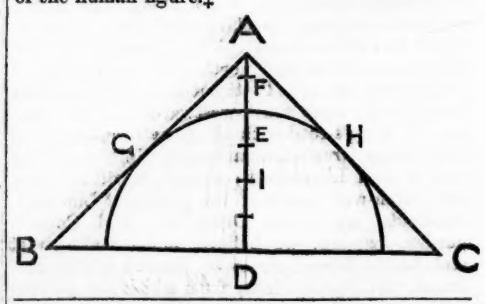
It will be observed that there is no such division in this ancient canon as that adopted by Audran, the Count de Clarac, and all modern artists,—the division of the head into four equal parts. It will also be observed that all the propositions here laid down relate to the longitudinal divisions of the human frame except only one, which bears reference to the width of the shoulders; for the transverse dimensions differ very considerably in every individual, and it is in these measurements alone that the differences between a Hercules and an Apollo, a Mercury and a Jupiter, are to be sought, but for which no law or canon is given.

With regard to the longitudinal proportions in this canon, however, I shall be able to show that they are the normal proportions of a full and well-grown man equally removed from two opposite qualities of growth; namely, that quality of growth in which the characteristics of the infant are retained in a greater or less degree,—as, for example, a large head, long body, and short extremities; and equally removed from that opposite quality of growth in which the characteristics of the adult are exaggerated,—as, for example, a small head, a short body, and long extremities.

To illustrate the first-mentioned quality of growth, I have brought a small ancient statue of the Egyptian god Pthah, and for an illustration of the second quality of growth, I must refer you to the engraving and description of a statue in the beautiful work of the Count de Clarac, vol. v. plate 840. The statue alluded to is in the marble of Mount Hymettus, and, therefore, probably a Greek work; nevertheless, it is remarkable for the disproportionate smallness of the head, and the length of the extremities.†

Now, according to this canon, you will observe that the measure from the crown of the head to the sole of the foot is exactly equal to the measure from the extremity of one hand to the extremity of the other, when the arms are extended. This exact equality of measure, we shall find, is the normal affinity or proportion which should exist between these two dimensions of the human frame; for if any given number of persons whose occupations and habits of life are conducive to the full development of the structure be measured, it will result that in nearly half the number the measure of the entire height will exceed, in various degrees, the measure of the extended arms; that in the other half, the measure of the extended arms will exceed, in various degrees, the measure of the entire height; and that only a few in each section will correspond exactly to the proportion given in this canon. Thus, then, the normal proportion or affinity which should exist between these two dimensions of the human frame is established to be exactly equal, the mean measurement between the two great sections confirming the canon. In the same way, or by an analogous process, have all the other affinities recorded in the canon, and set forth in the diagrams, been ascertained.

I need not dwell, in this room, on the necessity of producing strictly what may be called geometrical elevations of the human figure in the elucidation of this subject, and also for explaining a most ingenious discovery appertaining thereto, by our celebrated countryman, Mr. John Gibson, and by which, in practice, precisely the same proportions of the figure may be attained that have already been quoted from Vitruvius. The invention I am about to explain Mr. Gibson has allowed me to place in the hands of his brother-artists in a small pamphlet on the subject of the proportions of the human figure.‡



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*. Read by Mr. Joseph Bonomi at the Royal Institute of British Architects, Nov. 29th, as previously mentioned. For report of the discussion that followed, see p. 816, vol. xvi.

† This last sentence is irreconcilable, and does not occur in Leonardo's version.

‡ A *sixth* part is given to the distance from above the chest to the highest point of the forehead; and from the same point to the top of the skull is a *fourth* of the whole stature. In this sentence there is obviously a mistake in the numbers, which is corrected in part in Leonardo da Vinci's translation. It should be a *seventh* part is given to the distance from above the chest to the highest point of the forehead; and from the same point to the top of the skull is a sixth. The fourth is from the line which crosses the breast at the nipples to the top of the skull.

§ Leonardo makes it a seventh. In the best antique statues it is something more than a seventh, but not quite so long as a sixth.

* That is to say, those numbers (6 and 28) which are equal to the sum of their factors or divisors, were called τέλειοι—*e.g.* 3+2+1=6, and 1+2+4+7+14=28; and 6 is the number into which the cubit is divided.

† This statue was found in making an excavation in the Trastevere, in 1849. It is larger than life, and represents an Athlete using the strigillum, and is now deposited in the Museo Chiaramonti.

‡ "Proportions of the Human Figure," by Joseph Bonomi. Second edition. Chapman and Hall. London: 1857.

Mr. Gibson directs that the sculptor should draw a right angled triangle, having the two sides, AC and AB, that subtend the right angle, equal to each other. From the centre of the hypothenuse, D, describe a semicircle which shall touch the lines AC and AB. Draw a line from D to the apex A. Divide this line from D to the periphery E into four equal parts. Make EF equal to one of those parts. The diagram thus constructed contains all the dimensions of the principal divisions of the human figure. For instance, the hypothenuse, BC, represents a measure that is repeated three times. First, from the heel to the middle of the patella; secondly, from the middle of the patella to the superior spinous process of the ilium; thirdly, from the bottom of the abdomen to the pit of the neck. Thus, the hypothenuse of the triangle furnishes the measure of the distances from each other of three very important points or divisions of the human figure, both in the perfectly erect position, and in that of standing at ease.

The sides of the triangle, AC or AB, represent a measure that is repeated five times in the same figure. Namely, first from the top of the instep to the bottom of the patella; secondly, from the top of the patella to the pubis; thirdly, from a little above the navel to the pit of the neck; fourthly, from the top of the shoulder to the point of the elbow (of the straight arm); and, fifthly, from the elbow to the knuckle of the middle finger. Thus, the measure of five very important divisions of the human structure are ascertained by the sides subtending the right angle.

The remaining dimensions for completing the structure are contained in the line AD, for from D to I is the length of the neck; from D to E is the length of the face, measured from the chin at its juncture with the neck to the highest point of the forehead. From D to F. is the measure of the head from the chin to the top of the scalp, taken in the direction of the red line in the drawing; and, lastly, from D to A is the measure of the foot from the heel to the end of the great toe.

All these measures obtain exactly when measured with the callipers on the finest Greek statues, and on the best living models; but, you will observe, as indicated by the red lines on the drawings, these measures are taken obliquely, and in some instances inclining in two directions, as, for example, that from the heel to the middle of the patella inclines outwards in the front view, and forwards in the side view, which two obliquities reduce the vertical measure of the distance of the middle of the patella from the ground to the level, corresponding exactly with the middle of the patella, as obtained by the Vitruvian canon; so, likewise, do all the measures obtained by the triangle of Gibson coincide exactly with those designated or obtained by the four horizontal divisions or lines of the Vitruvian diagram. This accordance of the Vitruvian canon with the practical method invented by Mr. Gibson is further demonstrated by the perfect similarity of both halves of the figure in the drawing, half of which is constructed according to the Vitruvian canon, and the other half according to the simple and practical invention of Gibson, a remark that applies equally to the two profiles of the same figure.

As before stated, all the proportions given by the triangle of Gibson obtain exactly when measured by the callipers on the finest antique statues, and on the best living models of both sexes; only those, however, which have but one inclination can be measured with the compases on these geometrical elevations; this circumstance alone determines the inadmissibility of perspective delineations by way of elucidating the subject, for in drawings in which that essential of the painter's art is admitted, no measure at all can be taken. The two profiles and front view of the same figure standing at ease are exhibited in the diagrams in strong black lines, while the faint red lines show the same figure in the perfectly erect position; by the change from the perfectly erect position to that of standing at ease, one fourth of a head, or, in other words, a thirty-second part of the entire height is lost.

The centre of gravity is removed 1¼ inch from where it fell in the erect figure, of six feet high, namely, from between the ankles to nearly the middle of the ankle of the leg, which sustains the whole weight of the body, while in the profile it remains where it was in the erect position. Also, it is to be remarked that by this change of posture, where the black contour departs from the red contour on one side, there is an exactly corresponding departure on the opposite side; or, in other words, the excess on one side is balanced by an exactly corresponding loss on the other.

The remarks I have had the honour to address to you would be lengthened to an undue extent by referring to a work of Albert Dürer, on the "Symmetry of the Human Body," * illustrated by about 200 woodcuts. However useful and curious this extensive treatment of the subject may be, it does not appear to me to supersede in any degree the valuable text of Vitruvius, as elucidated by Leonardo da Vinci, and considered in connection with the practical discovery of our celebrated countryman, Mr. John Gibson.

THE NEW FOREIGN OFFICE.

THE following is from a letter addressed to "Sylvanus Urban," touching the appointment of Mr. Scott:—

I hope and I believe, that it by no means follows, that the design which was exhibited by Mr. Scott is to be implicitly followed: it will of course be subject to such modification and improvement as Mr. Scott's judgment and experience may suggest to him, and I hope that the effect of this will be to get rid of the *foreign* look which pervaded it, according to my ideas, and those of several others whose opinions are perhaps entitled to more weight than mine. It is true that the mediæval palaces of Italy are very tempting models, or rather storehouses to furnish ideas, because there is more street architecture of the middle ages remaining in Italy than in the northern countries, and these Italian palaces are very beautiful examples in their way; but the Gothic of Italy differs much from our own Northern Gothic, and is generally late work copied from Northern buildings, and a jumble of all the styles, mouldings, and details of the twelfth century, such as the cable and billet, with trefoil cornices or corbel-tables of the thirteenth, and windows with tracery of the fourteenth, all jumbled together in the same palace really built in the fifteenth. However beautiful such buildings may be in their proper place, they will never be satisfactory to English eyes in England. If, indeed, it has been decided to employ brick, and especially moulded brick, there is more ground for going to Italy for authorities: such buildings as the public hospital at Milan, or the palace of Mantua, may well excite emulation, to show what can be done in brick: the beautiful and minute details are admirably executed, and relieved with great judgment by large intervals of blank wall, a feature of which our modern architects seem rather afraid.

But even if moulded brick is to be used, I doubt whether the mediæval brick-work of the north of Germany is not more consistent with the bold, vigorous, manly Early English style, than any to be found in Italy. Some beautiful specimens of these have been published by Mr. Street, and others years before by Mr. Repton in the "Archæologia," vol. xxi. It may, indeed, be asked, why look out of England at all for examples of our own national style? We shall not find the same pure unmixed Gothic anywhere else; and although it is true that we have no street architecture of the thirteenth century remaining, there is the more scope for the genius of the architect to display itself. We must not yield to the clamour of popular ignorance, which always supposes that church architecture is one thing, and house architecture another. Our ancestors knew of no such distinction: the windows of a church, of the refectory of a monastery, or of the hall of a castle or a palace, are all exactly alike at the same period, at least externally: within they are distinguished only by the seats in the sill of a window required for secular purposes.

Some persons, I am aware, dispute whether the Early English Gothic is peculiarly English at all, but this arises from want of observation or misapprehension. No one means to say that England had a monopoly of the beautiful style of the thirteenth century, which arose almost simultaneously among all the Gothic nations settled in the northern parts of Europe; but, while the general character of the age is very marked, it is modified considerably in each country, and each has thus a national style of its own: the Early English Gothic is not the same as the Early French or Early German Gothic, and there is no such thing as Early Italian Gothic: the style was not introduced into Italy until a later period. The peculiar characteristics of the Early English style are the round abacus to the capital, the fine suites of mouldings to the doors and windows, deeply cut in bold rounds and hollows, and the free foliage. In foreign Gothic the abacus is always square (a classical feature inconsistent with the spirit of Gothic), the windows have usually no mouldings at all, and the doorways few in comparison to the English. In the general proportions of the parts of building, also, there is in England always a harmony and consistency which is wanting in foreign examples. Every one who has travelled must have noticed the heavy, lumpy appearance of the French cathedrals at a distance, as contrasted with the well-proportioned, elegant outline of our own Salisbury. There is also, as no one knows better than Mr. Scott, a material difference in the principles of construction between English and foreign Gothic. In English Gothic, the vaults are always constructed on the principle of the dome springing from corbels, fully developed in our beautiful fan-tracery vaults. This principle is not found in French Gothic, as has been shown by M. Viollet-le-Duc, the highest living authority on such a subject. These differences are quite sufficient to show that the Early English Gothic was not copied from the French; and the question naturally arises, from whence then did it rise? No question has been more frequently asked, or had a greater variety of answers given to it; and I do not presume to suppose that I can give a satisfactory answer. But every one has some theory on the origin of Gothic architecture, and I may be allowed to have mine. I believe, then, so far as I have at present been able to investigate the matter,—I believe that our English Gothic originated at Angers in the time of Henry II. king of England and count of Anjou, who held his court there for several years, at a time when all the west of France formed part of the dominions of the king of England. His court was attended by the nobles and higher clergy of England, of Normandy, and Aquitaine. It was a great building age, one of the periods of a great movement in the human mind,—what we call, *par eminence*, THE Period of Transition; and it was natural that when the leading minds of the English dominions were thus congregated together, they should compare notes on the architecture of their respective provinces. The men of the south had domical vaults and pointed arches, but their buildings wanted height and lightness. The men of the North had more aspiring notions, but had not ventured upon vaulting over large spaces, and were ignorant of the domical principle of constructing vaults. Actual domes had been introduced from the East into Portugal, and although lofty domes did not spread beyond that province, the principle on which they were constructed had been already introduced extensively into Anjou and Poitou. Just at the period to which I have referred, the public hospital at Angers was being built: it was founded, endowed, and completed by Henry II. and opened by him with great pomp in 1184, having been commenced in 1177. The buildings of this hospital, including the fine hall and the chapel, remain nearly in the state in which they were left at that time. It has always been, and still is, the public hospital of the town and neighbourhood: the endowment is barely sufficient to support it and keep it in repair, and there is neither any record nor any probability of its ever having been rebuilt or materially altered. This I believe to be the earliest Gothic building in existence, and the origin of the Early English style. It is almost pure Gothic, with lancet windows, with some remains of the Norman style. Becket's crown at Canterbury was also finished in the same year 1184, and is exactly in the same style. This I need hardly say is the work of William the Englishman, after the departure of William of Sens in 1179. There is a marked advance in the style of that part of the cathedral, and Professor Willis, in his admirable history of it, has enabled us to see exactly where the work of each year commences.

Your readers may naturally ask, What has all this to do with the new public offices? I answer, that it gives a reason for directing the attention of Mr. Scott and of the public to the English provinces of France, for any new ideas that may be wanted, in preference to any foreign country, more especially one with which we had so little connection as Italy. I am quite aware that the mere fact of different provinces being under the same crown had little or no effect upon their architecture, but the intercourse of the people had the greatest possible effect upon it. The architects of those days borrowed new ideas or new forms from each other quite as much as those of our own day. The recently-published album of Villars de Honnecourt, an architect of the middle of the thirteenth century, contains sketches of Rheims Cathedral and other buildings, then just erected, or in the process of construction; and these sketches were evidently made with the intention of using them freely in any buildings he might have to construct elsewhere. If it is desirable to revive the English Gothic of the

* "De Symmetria partium humanorum corporum."

thirteenth century, it is evidently also desirable that our architects should follow the example of Villars de Honnecourt, and examine the neighbouring provinces and neighbouring countries for other buildings suitable to give them new ideas; and they should have recourse, in the first instance, to those provinces and those countries which the architects of that period would have gone to, therefore to those provinces and countries with which the people of England had most intercourse at that time. These were, first and chiefly, the English provinces of France, and next the other adjacent parts of France, or rather the different countries which are now included in France.

The influence of commerce in producing this intercourse between the people is well known, and accordingly the line of commerce at particular periods is always marked by the buildings on that line being in advance of others which are remote from it. In the twelfth and thirteenth centuries, the line of commerce, the direct high road from England to the Mediterranean, to Rome and to the East, was through the English provinces in the west of France, in as direct a line as possible through the northern parts of Normandy and Brittany, along the line of hills through Limoges and Perigueux, and skirting the foot of the Pyrenees, and by the Mediterranean port of Aigues Mortes, now blocked up, the sea having receded in this part. This line is said to have been taken originally at an earlier period to avoid the incursions of the pirates in the plains near the sea, perhaps also to avoid the embouchures of the rivers before any bridges were built. Whatever the cause, this was the line which English architects in the thirteenth century were most likely to take, and this seems the most natural line for us now to follow, without adhering to it rigidly, or refusing to make such excursions to the right or to the left as our predecessors were very likely to have made. But with Lombardy they had no intercourse at all, and it is the last place we should go to for authorities. Our neighbours the French were always jealous rivals, and their architects kept pace with our own, and, although the French Gothic of the thirteenth century is different from the English, it is more like it than any other, and therefore the best suited now to furnish us with ideas or forms suitable for our purpose. Whether the massive, heavy, transitional work of Notre Dame at Paris or St. Denis is earlier than the corresponding work at Malmesbury and many other places in England, is immaterial to the point, the English and the French architects each developed rapidly, and the two styles run nearly *pari passu*, and bear frequently a close resemblance to each other, although still distinct. There is abundance of house architecture and street architecture of the thirteenth century remaining in various parts of France, and it harmonizes far better with our English style than any other.

JOHN HENRY PARKER, F.S.A.
President of the Oxford Architectural Society.

THE ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.

IT is always ungracious, as well as ungrateful, to appear to complain at all of the result of efforts which, being purely voluntary, deserve the warm thanks of all who profit by them; and in what I am about to say, therefore, I wish only to throw out a suggestion, and not to make a complaint.

I think many of the subscribers to the Architectural Photographic Association must have felt, as I did, that the photographs now being exhibited did not, in one respect, fulfil all their expectations. Probably most of us feel that there can be no very great architecture unadorned by sculpture, whilst we may think that the architectural lines of a building are even better seen and better understood by an elevation than by any picturesque view, or even by a photograph. To all who feel this, the collection now being exhibited is so far a disappointment, inasmuch as it scarcely contains any examples of purely architectural sculpture. And I think there is a double danger in this fact; for whilst it may make the Association less practically useful than it might be, it may also lead the world to suppose that our profession, as a body, ignores, to some extent, this necessary connection between the two arts, and is content, only, to aid in prolonging the practical aversion to sculpture, which has distinguished (in a very bad sense) our English architecture for a very long period.

I can quite understand the difficulty which the committee, no doubt, have in meeting all views, and during the popularity of their association; but I think it will be an aid to them rather than the contrary, if those who know (as I do) that there is a growing feeling, which this year they have in no way satisfied, venture in a very friendly spirit to express that feeling. The truth is, that most of us know tolerably well the general outline and effect of most of the buildings of which it is likely we shall obtain photographic views; whilst comparatively few have been able to travel sufficiently to see with their own eyes all the delicate detail which often distinguishes them; and even to this happy and select class the value of absolute *fac-similes* of the decorative sculpture is of infinitely more value than any other kind of illustration can possibly be. Most of us know, *e.g.* the general idea of the west front of Orvieto Cathedral, but how very few have the least conception of the exquisite beauty of the sculpture which adorns the whole of its lower stage! And, again, though we have been again and again at Chartres, or Rouen, Amiens, Paris, or Rheims, how difficult—is it not?—to carry away with us all the lessons which the wonderful sculpture enshrined in their buildings teaches us!—and how full of instruction, on the very point on which we all stand most in need of it, photographs of such sculpture are, all who have carefully examined or used them know very well.

I dare say there may be very many difficulties in the way unseen by me. But if it were possible next year, instead of employing Mr. Bedford's powers on the reproduction of such thoroughly well-known buildings as Chepstow, Tintern, and Raglan,—to obtain from him photographs, to a large scale, and in detail, of the west front of Wells, the sculpture at Higham Ferrers, or Lincoln, or elsewhere, I predict, confidently, that a large, sale of whatever he did, would be an immediate result, and an improvement in our own work a natural consequence. Whilst, again, if one of the French photographers would obtain large details of the doorways at the west end of the aisles of Rouen Cathedral, or of some of the foliage sculpture of the capitals of the same cathedral; or if one of the Italian artists would do the same for the glorious west front of Genoa, a want which many of us must have felt would be supplied, and we should be additionally grateful to the committee.

The truth is, that our Association ought not to think first of all of popularity. Like the Arundel Society, its functions would be best fulfilled by obtaining for us illustrations of work, which is not of sufficient popular interest to be done by private speculators; and which is, nevertheless, to the true artist very often of a value and interest which cannot be exaggerated.

GEORGE EDMUND STREET.

BRITISH MUSEUM—THE CHRISTMAS HOLIDAYS.

ON Monday last the scene presented at this public institution was of the most gratifying description. At the hour of opening, streams of school boys and girls, and family groups, both town and country bred, might be seen flowing along the streets towards the main entrance. As the day advanced the number of holiday folks continued to increase, until the galleries of antiquities and natural history, and the manuscript room and king's library presented a most animated appearance. At one time there could not have been fewer than 30,000 persons within the walls of the building. It was curious to contrast this crowd with a recollection of the deserted appearance of old Montague House, in those days when parties were admitted by tickets, which were limited to a small number each day, and when it was considered dangerous to admit the English public amongst works of art. It was also a matter which raised curious reflections to see those bustling thousands wandering so life-like and animated amongst the relics of past ages and peoples.

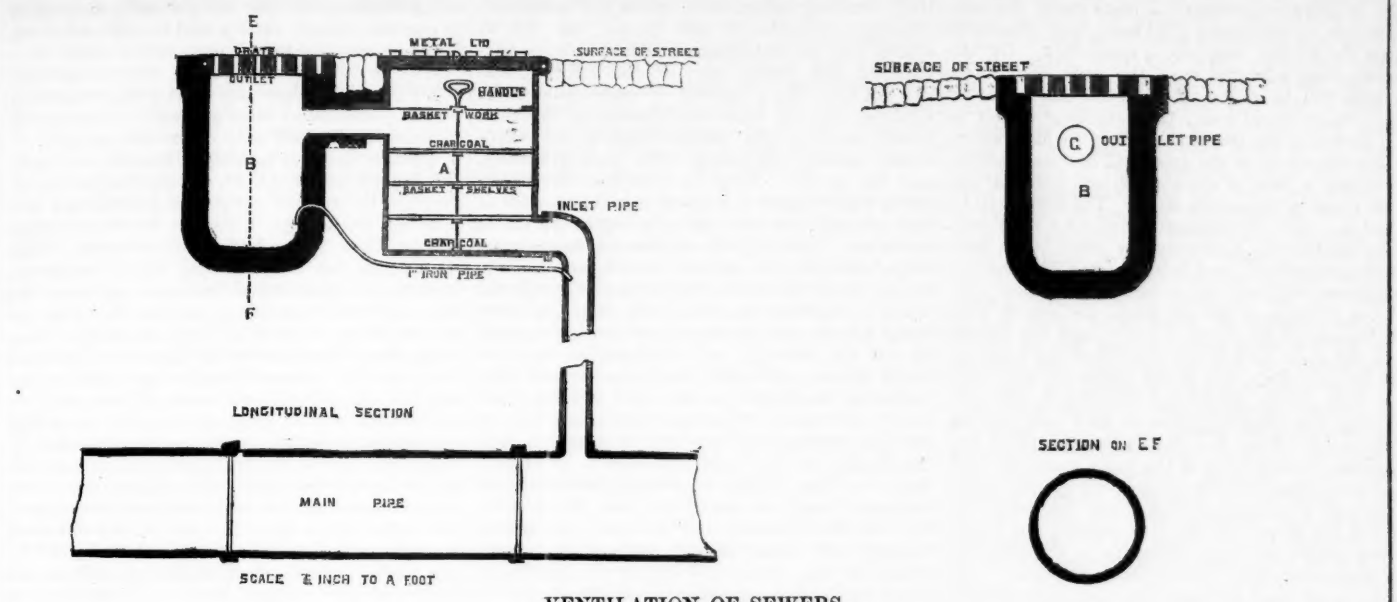
The bulk of the visitors evidently belonged to the working classes, and it was pleasant to see the comfortable and well-clad appearance of the majority. The conduct of all was admirable, and although in the course of Monday upwards of forty-two thousand persons were admitted, no case of intoxication or ill-behaviour was noticed. Such a gathering as this was creditable to the intelligent part of the working population of the metropolis; and although it must be admitted that some passed by the rare objects collected here in a somewhat hurried manner, having scarcely learnt to see; it is certain that not even the most careless can pass through these galleries without gathering wholesome materials for future thoughts. During the day large numbers were admitted who applied in the proper quarter for permission to get a glance at the new reading-room, and it was quite right that the opportunity was given.

The document which has been addressed to the Premier by thirty-six leading men in painting, sculpture, and architecture, in connection with the immediate necessity which exists for additional space for the proper reception of the rare treasures of ancient art which are arriving in this country, is worthy of the gravest attention. In this memorial attention is directed to the circumstance that numerous cases containing sculptured antiquities from Halicarnassus, Miletus, and Carthage, about to arrive, will require considerable space, and that considering the expedients to which the authorities of the British Museum have lately been driven, in order to find room for other important works of the kind, the means of accommodating such monuments are lamentably difficult. The manner of disposing of many of these remains is alike injurious to the works and discreditable to the country.

After noticing the great value of the ancient sculptures in the Museum—some of which are the undoubted work of Phidias and his contemporaries, and are unrivalled by any specimens preserved in foreign galleries—the other archæological monuments, illustrating the development of art from the earliest time of a value to the historian and scholar beyond calculation, are alluded to. The first and immediate object of this address is to secure for these works such accommodation as may insure their preservation. The collection of sculpture from all parts of Greece, Asia Minor, Italy, Egypt, and Assyria, has during the last few years accumulated to an extent that imperatively demands attention on that ground alone. The latest and some of the finest of our acquisitions, comprising remains of one of the most remarkable monuments of antiquity, one of the so-called "wonders of the world," the Mausoleum of Halicarnassus, and the undoubted works, in statues and relievo, of the most eminent sculptors of the fourth century before our era who were employed in its decoration, are now placed outside the building under the portico, while the only protection against injury from our variable climate from the soot and dirt of London, and other accidents, is provided by encasing or enclosing them in unsightly glazed magazines and workshops. The additions just announced must also, for want of space, be treated in the same way—be unworthily treated—and probably it will be necessary to enclose in this way for their reception the whole of the colonnade in front of the Museum!

After alluding to the great risk to which these precious works are liable from frequent removal, the memorialists truly remark that "the study of archæology and of the history of the various schools can only be carried on with advantage when the examples for reference are of easy access, and when the various subjects which are the foundations of those studies can be directly compared with each other. It is felt by scholars and the students of antiquity especially, that the close association of examples of sculpture of various periods and schools, whether they consist of marble or bronze statues, relievi, busts, coins, or other objects, whatever their class, is indispensable for the proper and useful prosecution of their inquiries. Any division or distribution of such works in different and distant localities is to be deprecated; and, therefore, in earnestly pressing upon the Government the expediency of taking such measures as may seem fitting in the first place for the preservation of the valuable monuments we may possess, the hope may at the same time be expressed that such extensive accommodation may be afforded as may include and combine all these works in one accessible collection."

All visitors to the sculpture-galleries of the British Museum must acknowledge the truthfulness of the remarks which have been made by the memorialists; and the matter for consideration is in what manner the increased space can be best provided. A glance at the ground which skirts the present building will show what noble galleries may be made by extending the present building to form a front to the south side of Montague-place. If the whole square bounded by Montague-place, Bedford-square, and the street forming the eastern boundary, were purchased for this national purpose, we should have a site which would admit of not only a magnificent architectural display, but would also afford space for centuries to come for any possible demand for proper room for sculptures, books, and prints. As regards the library, the accommodation provided by the recent alterations will prevent care in this respect for a long time yet.



VENTILATION OF SEWERS.

REFERENCES.

A. Purifying box with basket-work slides to hold charcoal.
B. Débris trap to prevent débris or water falling on the charcoal.
C. Syphon pipe for taking water from débris trap.
D. Metal lid for allowing access to purifying box to recharge purifier.

VENTILATION OF SEWERS.

I HAVE seen of late several reports respecting the ventilation of the City sewers, first by Dr. Letheby, the medical officer to the City Commissioners of Sewers, and lastly by Mr. F. Haywood, their engineer, both of whom concur in the use of charcoal as a defecting substance to be used at the outlets of the ventilators. Knowing a little of the matter, I beg to submit to you the following facts:—In the years 1852 and 1853 I commenced to lay out the system of sewerage of this borough, which comprises about 54 miles of public sewers. At that time I had a little difficulty about the ventilation, and in conversation with an eminent surgeon of this borough, then in our council, and a gentleman who had paid great attention to sanitary matters (Dr. Mordey), he stated, as I had also observed myself, that in the sewerage of the city of Durham the ventilators were merely pipes brought up into the centre of the street, and from which there arose a very offensive smell, and he thought that the use of charcoal would prevent this, and asked me if I could put it into a working shape. I stated I should do so, and, after making an experiment, I produced the plan annexed. I afterwards spoke to Professor Johnson, who stated that the peat charcoal would cost from 3*l.* to 4*l.* per ton, and, when charged with the gases emanating from the sewers, would probably be worth from 8*l.* to 9*l.* per ton. About four years ago this plan was enrolled, and now forms part of our system of sewerage; and I have in my possession the sheet of drawings submitted to the General Board of Health, on which is their official stamp. At that time several copies of the plan were forwarded to London for the opinion of men whom I considered at that time better able to judge of the scheme than myself. Without any arrogance in the matter, I state that, in this borough, the application of the plan was first introduced as a part of the much required sanitary requirements of large towns.

WILLIAM CROZIER, *Borough Engineer.*
Sunderland.

ADVERTISEMENTS ON STREET LAMPS.

AN offer has been made to several of the metropolitan parishes, and amongst others that of Clerkenwell, for the use of the street lamps for advertising purposes. At the Clerkenwell parish board this proposal led to much discussion. One gentleman thought that the plan would interfere with the public light, and said that one of the members of that body — an undertaker —would be likely to cover a large part of the street-lamps with mourning coaches, and other funeral devices; another member would cover the glazing with pots and pans; and that others in various ways would avail themselves of this means of directing attention to the peculiarities of their trades. It was also said that Clerkenwell had been called the "prison parish," and that it was to be feared if this suggestion was carried out, that it would be called the "advertising parish," and that it would not be right to let out the public property for the purpose of personal advertising. It was, however, suggested that it would be well, before coming to any decision, to hear the merits of the plan, and eventually Mr. Prisley, the projector, was called to answer questions put by various members. Mr. Prisley said that he held in his hand a copy of a contract which had been entered into by the Bermondsey board, and which only required signature. St. George the Martyr, Southwark, had also agreed to adopt the plan, and it had been favourably viewed by the parish board of Islington. He proposed to give the inhabitants of each parish the first choice. The lamps should be offered in the first instance to those living nearest to them; when, after the parish had been exhausted, strangers would be allowed to engage them. He bound himself in his contract not to place the advertisement of a hatter, a jeweller, &c. near to persons carrying on any of these trades, &c. &c. He was quite sure of being able to take up the whole of the 377 lamps in the leading streets: he was not so sure about the 216 in the by-streets.

It appeared that if this system were carried out in Clerkenwell, the profits to the parish would be about 377*l.* per annum, or about 25 per cent. on the whole amount of lighting. It was eventually agreed to postpone the consideration of the question for a time.

It is to be hoped that nothing will be done to disfigure the streets. We have before now suggested that the street lamps should be made use of in directing wayfarers at night.

PROVINCIAL NEWS.

Letcombe (*Berks*).—The new school of this parish was opened by the Bishop of Oxford on the 11th ult. The school-house is a simple structure of red brick, with string-courses and window rear-arches of red and yellow bricks in the interior. It was designed by Mr. Butterfield, and has cost between 300*l.* and 400*l.*

Ilfracombe.—Mr. Richard Bligh, an old and influential resident in this town, has offered to build schools at his own expense, provided the committee already at work would purchase the site, and fit up the building, after it was completed. This offer was readily accepted. The building, it is thought, will cost some 600*l.* or 700*l.* while the money already collected will provide for the purchase of the site and its conveyance to trustees. The site of the school-building is close to the church, lying between it and the sea. A design has been furnished by Messrs. Foster and Wood, of Bristol, architects, and approved of. The building will be proceeded with in the spring, and probably be completed before the end of the year.

Plymouth.—The new building at the corner of Treville-street, leading into Old Town-street, is nearly finished, and the scaffolding having been removed, the elevation is open to view. The block of buildings consists of three houses of four stories, the height being 50 feet. The style is Lombardo-Venetian. The walls are built for the most part of red and light gauged bricks, while the ornamental portions are executed in freestone and Portland cement. Polished Devonshire marble has been introduced in the windows of the first story above the shops, and tiles (from the architect's drawing) in those above. Mr. James Hine is the architect; and the builders are Messrs. Call and Pethick. The ornamental ironwork has been executed at the Plymouth foundry. Another improvement is being effected (under the direction of Mr. Hine) in Old Town, at the corner of Drake-street, by the erection of business premises, in the Italian style of architecture.

Milford.—The capabilities of Milford as a port of arrival and departure are about to be brought out by the construction of docks upon an extensive scale. It is proposed to make the enclosure of Hubberstone Pill, in the first instance, at an expense of 100,000*l.*; and this is shortly to be commenced. A company has been formed with every prospect of success. Arrangements have been made for steam communication between Milford, Neyland, the Dockyard Angle, and Dale, with steam-tugs for the harbour. The present dry dock at Hakin is also being enlarged.

Portrush.—The obelisk at Portrush to the late Dr. Adam Clarke is now finished. It is entirely composed of Newry granite, and is about 50 feet from the base to the summit, and occupies an elevated position at the principal entrance to Portrush, being 30 feet above the road. It is placed at the rear of one of the school-houses which the commentator himself had built.

Bradford.—New school-rooms are to be erected in Caledonia-street and Moody-street, at Bradford, Yorkshire. The works have been let to several tradesmen of the town. Mr. Paull, of Cardiff, is the architect employed; and the building is to be occupied on Good Friday next.

Leeds.—An addition has been made to the design for the New Grammar School. It has been decided to add a tower, over the junction of the roofs of the great school and the middle building. A tower, somewhat of this description, formed part of the original design, and was reluctantly struck out, on the ground of expense. At a late meeting of the Board, the architect was desired to furnish a design for a central tower, at an outlay of 200*l.*; and the trustees present, although the members of the board have contributed more than half the 7,000*l.* already raised, resolved to defray the expense by a new subscription among themselves, and, accordingly, sums ranging from 10*l.* to 50*l.* were at once subscribed, to the amount of upwards of 200*l.*

Jarrow.—The docks, constructed by the North-Eastern Railway Company, at Jarrow Slake, are so far completed, that the water has just been let in through the sluices at the north end of the works. The event was celebrated by the firing of cannon, &c.; and the workmen at the docks were entertained at the various inns in the neighbourhood. The dock and tidal basin, according to the account of them in the *Shields Gazette*, will contain about fifty acres of water, and accommodation will be provided for between 400 and 500 vessels. The tidal lock, 100 feet in width, and upwards of 250 feet in length, has entrance-gates 60 feet wide; while the tidal entrance, 80 feet in breadth, will admit ships of large size. There will be a depth of 24 feet 6 inches on the dock sills at high tide, and 24 feet on the inner area. When the docks

are in operation, vessels will come round the dock pier into an unenclosed tidal basin, and afterwards pass the 60 feet lock into a small dock. On the water being admitted from the main dock, these vessels will be raised to its level, and admitted into the principal dock; thus enabling vessels to be docked from the time of low to high water, when the whole of the gates will be open, thereby relieving a fleet of ships which may arrive at one tide pressing upon each other. The docks will be used as a place of shipment for coals by the North-Eastern Railway Company, by whom they have been constructed; and it is expected that the first shipment will take place early in the new year. A tier of ships, at the old drops, lie side by side, at the end of the staith or jetty; and the nearest one can alone take in her coals from the waggons. At the new dock, and at the landward end, there are four jetties, stretching far inward, and each having five shipping-places at each side, making ten in all. Thus ten vessels can be lying and loading at every jetty at the same moment, there being a distinct line of rails to every spout. From ten to twelve thousand tons of coal may be put on board the ships in a day. At present, but two of these jetties have been fitted up for the shipment of coal, comprising twenty shipping-places. One jetty is set apart for ballast purposes, and possesses four of Armstrong's powerful hydraulic cranes, constructed on a new principle. From three to four hundred thousand feet of timber have been consumed in the construction of the jetties alone. Of ashlar work in freestone, the quantity exceeds 600,000 cubic feet. The granite measures from 15,000 to 20,000 cubic feet; and the rubble masonry, upwards of 80,000 cubic yards. The cellular iron gates of the 60-feet tidal lock, and 80-feet tidal entrance, manufactured by Messrs. Robert Stephenson and Co. Newcastle, weigh from 500 to 600 tons; and their heel-posts work in hollow granite quoins. They are worked with hydraulic power, on the newest principles of Messrs. Armstrong, who have fitted up the hydraulic machinery. The road behind the slake, running between Gateshead and South Shields, is spanned by five bridges (one of which is constructed of wrought iron, the remainder of brick and stone), which connect the dock with the North-Eastern Railway. The earth removed in the construction of the docks, amounting to two million yards, was principally silt. The locks and gates have been designed by the engineer-in-chief, Mr. T. E. Harrison, and carried out under his resident representative, Mr. R. Hodgson. The contractors for the whole works are Messrs. Jackson, Bean, and Gow.

"THE BUILDER'S" LAW NOTES.

Highway.—After a verdict against the inhabitants of a parish upon an indictment for the non-repair of a highway, it is no answer to an application for the imposition of a fine, that the road never has been repaired by any one.—*The Queen* v. *The Inhabitants of Claxby.*

Auction—Deposit.—The purchaser at a sale, which turns out abortive from vendor's inability to make a good title, cannot recover the deposit from the vendor as money had and received, though paid over to him, but must sue the auctioneer, he being the agent of both parties, to appropriate the deposit to the party entitled to it. —*Johnson* v. *Roberts.*

Factory.—Fencing Machinery.—On the trial of an action against millowners for not securely fencing a part of the machinery of their mill, whereby injury was occasioned to one of the persons employed therein, the judge left the question to the jury whether the machinery was fenced in the ordinary manner used and approved as sufficient at the best regulated mills in the district. It was held that this was not enough, for that the proper question was, whether the mill was securely fenced according to the best method of fencing known at the time.—*Schofield* v. *Schunck.*

THE CONVENTIONAL ORNAMENT OF THE THIRTEENTH CENTURY.*

If we take the best and purest periods of architecture—and the thirteenth century eminently claims to be one of them—we shall find that the architect always more or less departed from nature, according to the requirements of his work: thus the architecture was wholly and entirely conventional, and the figure sculpture, with some slight modifications, such as giving it more angularity, entirely naturalistic; while the ornament, although referable to real foliage, was yet so altered and conventionalized, that it always harmonized, and seemed part of the building, and did not look like a handful of leaves stuck on at random. In the later development of the thirteenth century, this conventionalism was abandoned, but still the change took place gradually, and bit by bit. Thus in a capital the strong horns which appear to support the abacus were at first retained, the only change being in the leaves at the end. Gradually these masses of leaves grew larger and still more natural; then leaves began to sprout out of the sides of the horns, and shortly the whole capital became covered with them, the horns being discoverable only by a close inspection, until at last they are got rid of altogether, and the heavy abacus, and arch moulds, as in most Late Decorated examples in our own country, rest simply on a mass of delicate leaves, and give to the eye anything but the idea of security. Unfortunately, of late there has been a great tendency to this method of treating architectural ornament, and, as usual, we have begun with the full development, and are now proceeding through the phase of the horns with natural foliage at the ends, until I hope we shall finally arrive at the conventionality of the early part of the thirteenth century. In the mean time we have been wearied to death by pulpits and fonts covered with baskets full of leaves, and when we do get figures, the scene appears to be taking place rather in the arbour of a tea-garden than under an architectural niche, as it ought to do. The consequence is, that the rigid lines of the architecture which ought to set off the more soft and sweeping lines of the figures entirely lose their effect. However, we are now gradually improving, and when we do arrive at the proper point, it is to be hoped that our architects will set to work in the proper spirit, not copying the old work servilely, but finding out new conventionalities of nature for themselves. The subject of our architectural sculpture has been so well and so often treated in the former lectures delivered at the Architectural Museum, that I have thought it better, in the present instance, to confine my attention to the flat ornament alone, such as was used for stuffs, tiles, stained glass, and decoration generally, although, indeed, many of my observations will be equally applicable to the flatter sort of sculptured ornament. Again, I by no means put forward the following prineiples as the only true ones on the subject, but simply as means by which certain combinations may possibly have been produced, and by which they may be so again.

It appears to me that most patterns are referable to the diaper, although some writers consider that the starting-point should be the border, inasmuch as a diaper may be considered to consist of many borders laid side by side. I think, however, that it is quite immaterial which of the two systems we select; but perhaps as many borders contain parts only of forms, which forms would be completed in the diaper, I feel upon the whole inclined to take the diaper as the point of departure, and to consider the border simply as a part cut off from a whole.

The Diaper.—If we draw any number of parallel lines at right angles to another set of similar parallel lines, all equidistant, and then mark the points of intersection, we shall have a number of dots, each of which is at an equal distance from its neighbour (fig. 1). These lines again can be drawn at an angle of 45 degrees, producing another set of points, which, in fact, are nothing more than the first set turned round (fig. 2). These appear to me to be the foundation of most systems of diaper, and, indeed, of ornament generally. They can be varied by making one set of parallel lines farther or less apart than those with which they intersect, thus forming parallelograms instead of squares (fig. 3), or by varying the distances (fig. 4); but as I have before observed, the first system of squares is the more general one, and which I propose to take as the basis of my illustrations, although any of the others would do very nearly as well. Now, if we apply any figure, either geometrical, natural, or conventional, such as a circle, a leaf, or a fleur-de-lys, to each of these dots we shall obtain the simplest form of a diaper, which is generally called a powdering, but if we wish for a more elaborate composition, or have a larger space to fill, there are several ways of going to work.

The first and chief of these is to put a geometrical form on each dot, and then place on it a piece of foliage or a scroll, or an animal. These forms are very numerous, and may be suggested by almost any object, and, indeed, they need not be geometric, but they are generally so, in order to present greater variety and to relieve the eye. These geometric forms may touch each other (fig. 5), or be at some distance from each other (fig. 6), or their edges may overlap (fig. 8), or they may be connected by other geometric forms (fig. 7), by lines, or alternate with others of equal size.

Another mode of making a diaper is to connect the dots by means of lines, and these again can be overlaid by another system of lines drawn at a different angle (figs. 9, 10), or the vacant spaces can be filled with a leaf, scroll, or animal; these lines again can be curved (fig. 11). Frequently, however, the geometrical forms are applied to the dots as in the preceding case, but then they are not supposed to be solid, but are simply lines. Very often other geometrical figures are laid upon them, so that a mass of lines are produced around our dots (fig. 12). These masses of lines are liable to the same laws as the geometrical forms, or they can touch or be far apart, or be connected by lines, or alternate, &c. or they may have ornaments in the spaces between them. Again, these lines often become ribbons and overlap or underlap at the intersections (figs. 13, 14). It is well known to what perfection this system has been carried by the Irish, Anglo-Saxon, and Eastern nations. In the thirteenth century, however, it was far more sparingly used, being mostly employed in conjunction with other ornament, and very seldom by itself.

But by far the most beautiful and universal way of connecting our dots with one another is by means of the scroll or spiral,—a form which occurs in several shells, and which has been drawn by the Greeks geometrically in the Ionic volute. A piece of elastic substance, such as parchment or paper, rolled up lightly and then let go, will also give the scroll, although in a much less perfect degree. Now the simple scroll can be variously applied to our dots; thus it can be placed in series, following one another, either face to face, or back to back (fig. 15); or it may be connected with its neighbour (fig. 16), so as to assume the form of a C, or, when reversed, resemble an S. These compound scrolls are employed in the same manner as the geometrical forms, but generally extend over two dots instead of one. The more common way is to connect the scrolls one with another, at the same time reversing each member, so that a continuous flowing line, with curved offshoots, is produced (fig. 17). This form of scroll is more frequently employed in every style of architecture than all the other forms put together. It is applied to the dots in the same manner as the other scrolls, but occasionally runs over the whole ground, the centre of each scroll corresponding with each dot, and one scroll joining into or growing out of the other almost anyhow, so long as the main lines are not too weak (fig. 18); if the diaper is large, other little scrolls grow out of the interstices. Now, a regular geometrical scroll is rather a weak form, and consequently various expedients are resorted to in order to strengthen it. Thus, in the thirteenth century we generally find a short, straight line added to the end, a little above the point where it joins into, or springs out of, its fellow (fig. 19). I have also seen scrolls in MSS. in which the artist has tried to get strength by making them almost of a square form. Another way to strengthen the scroll is to increase the number of convolutions, and to let the succeeding scroll grow out from the inner or second convolution instead of from the outer (fig. 21): the lines then cross, and seem to sustain one another. The same effect is got by making two scrolls overlap one another (fig. 21). Strength is also obtained by means of the stalk, which is often made of two lines; in this case we can get variety by making the subsidiary details spring from the inner (fig. 22) or outer (fig. 25) line, or from both equally (fig. 24). Occasionally one of these lines is very much thicker than the other (fig. 23). When, however, the stem is supposed to have substance, and ceases to be a line or lines, it is strengthened by various ornaments, such as pearls or diamonds placed between two edgings, (fig. 45, 46) or by having leaves springing out of one or both of these edgings (figs. 26 and 27), and going to the opposite side. By this means the sides of the stalk, which in this case is generally very thick, are connected together by the oblique transverse lines, which help and follow the general movement of the scroll. The same thing, although to a greater degree takes place when the leaves are prolonged from one convolution to another, or beyond it altogether (fig. 28). Sometimes the ornament in the eye of the scroll does the same thing by throwing out leaves or little scrolls which cross the convolutions (fig. 29). Sometimes the rigidity of the scroll is

* Read by Mr. W. Burges, at the Architectural Museum, on Wednesday, 22nd ult.

helped by the addition of purely conventional lines (fig. 30).

A scroll is also greatly strengthened by a judicious treatment of its point of junction with or divergence from its next neighbour; this can be done in several ways: thus we can make use of a leaf or ornament, simple or compound, or a human or animal head, or simply by thickening the convolution at that point, or by an annulet, or by a dividing line or by serrating the edge of stalk at that particular point, as if there were an outer bark or skin vigorously pushed back. This latter is a very common and graceful expedient (fig. 31).

The centre or eye of a scroll can be filled either by a simple ornament, or compound one, with several curves. In the latter case it will be treated in a very similar manner to any other geometrical form. (See farther on.) Great variety and beauty are got by the introduction of birds, animals, or human figures, in scrolls, and, indeed, in all ornament generally. The prominence given to the eye ornament depends very much on the size of the stem, but generally it is as well to have scrolls or lines issuing from it, to connect it well with the convolutions.

The Border.—Having got thus far with our diaper, it may be remarked that the border may generally be reduced to a slip of diaper cut out and enclosed between two lines (fig. 32), and applied to the edge of another diaper entirely different to it in arrangement and colour. A cresting is a slip of diaper, with vertical or inclined members, but with no line at top: it is generally placed above a border (which in this case is often reduced to two parallel lines), and applied to an unornamented ground (fig. 33). A border is often supposed to be repeated at certain intervals over a diaper; but then it should be of a different composition: thus, if the border has a scroll, the diaper should have a powdering (fig. 34), or *vice versâ*,—the most intricate composition, as the border in the present case, being made thinner than the other to restore the balance.

The system of superposition is often carried to a great extent, especially in the coloured backgrounds of the MSS.: thus, in fig. 35, there is, first of all, the blue ground; then come the thick straight black lines, and over them the network of white quatrefoils; and, last of all, the scarlet crosses. Occasionally the ground and lines are nearly of the same colour, such as murray and white, while over all are animals, birds, &c. in a colour strongly contrasting with the ground. Mr. Winston has shown that the secret of the composition of the Salisbury grisaille lies in the superposition of sundry discs, lozenges, and quatrefoils.*

We must now consider the geometric forms to be placed on the dots, and which generally have some ornament placed on themselves. Almost any geometrical form will answer the purpose, besides the more simple of them, such as the square, the parallelogram, the triangle, the hexagon, octagon, &c. (fig. 36); we have the circle, with its various combinations of 3-foil, 4-foil, 5, 6, 7, 8-foil, &c. (fig. 37). Then these again can be combined with other forms or with themselves, and they can also be reversed; but, as a general rule, I think it better to avoid the pointed phase of the foils, as they are not very harmonious when used in conjunction with each other, and are apt to suggest disagreeable reminiscences of tracery,—that last refuge for the destitute. Again, two or three geometrical forms can be superposed, but then they are generally considered simply as lines or strings, and not solids; they thus form a knot of lines (fig. 12), and require little or no ornament to complete them. Now, in mediæval art† it is a well-known fact that the details increase with the size of the object. Thus in diapers sufficiently large for compound geometrical forms, or for simple ones of a large size, the edges of these forms have always a border, or, as heralds would say, they are fimbrated. Thus a golden quatrefoil would be placed on a green ground; upon this golden quatrefoil would be put another quatrefoil, say of red colour, but smaller in size than the golden quatrefoil, so that a thin piece or border of the latter would be seen all round it; then upon the red quatrefoil might be placed a golden or silver ornament, or animal, or bird, &c. This border is capable of all sorts of ornamentation, like the stem of the scroll: thus it can have pearls or diamonds (figs. 45, 46), or even inscriptions, or if it be very large, small scrolls (fig. 47). Occasionally it has a cresting, but this seldom occurs in early thirteenth-century art, and perhaps upon the whole had better be omitted. The same mode of ornamentation can be applied to the compound geometrical patterns, when the lines are enlarged to ribbons; occasionally parallel ribbons touch one another so as to give greater intricacy (figs. 38, 39).

The next thing is to fill these geometric forms with ornament. If the form is small, the ornament must be simple, but the great point is to make it *well fill up the space it has to cover*; thus the *fleur-de-lys* goes well into a lozenge, and a rose into a circle. But if the geometrical form be large, the ornaments must spring from straight lines, or curves or scrolls. Of course the number and direction of these will vary according to the shape of the form, some forms receiving certain combinations better than others: however, we will take a square, as it is one of the simplest and most frequently occurring (fig. 40). First of all the lines can spring from the centre, and go either towards the sides or towards the angles, or, if the square be large, towards both: or they may spring from a centre-line, and follow one another either in simple or compound scrolls, converging or diverging, as the case may be, or they can spring from the sides or angles, and converge to the centre; or the square can be occupied by a single curve springing from the angles; or straight or curved lines may be laid in various positions on the field, and others laid over them: in fact, the variety to be obtained by various combinations of curved or straight lines is almost infinite. Again, if the square be very large, a smaller geometric pattern or patterns may be superposed on the larger (fig. 41), and the foliage spring from them, or they may have their own system apart. This is a very good way of treating ceilings, for anciently a diaper was *never used by itself over any extended space*, except a pavement. In MSS. and in wall paintings, it is used simply as a background to figures. Grisaille windows seldom present any very large surface, and even then it is often cut up by a band of shields, as in Salisbury Chapter-house, or by a series of histories. But in the stuffs and tapestries, where the repetition was unavoidable, the dresses were generally so contrived as to show an under-garment of a different pattern, and thus vary the general effect. While if we examine the MSS. we shall seldom or never find a representation of a room entirely hung with tapestry of the same pattern; on the contrary, it is almost always counterchanged. Thus we may well cease to wonder that certain churches whose interior walls are covered with a sea of diaper, after all do not look like ancient work, but, on the contrary, unpleasantly remind us of our very old friend, the paper-hanger.

The last point to be noticed is the conventional foliage applied to the lines and scrolls, and the treatment of the animals, so often introduced for the sake of variety. Fig. 42 shows some of the conventional foliage taken from various sources. Here we may observe that the general type is the side view of the leaf, with or without an indented edge. The same principle of increasing the details with the size of the objects, obtained here as elsewhere. Thus, if the leaf be small, the edges are plain; if, on the contrary, it be very large, it has secondary indentations; sometimes, instead of these, we have lines round the edges. If the leaf be long, the point turns over, and occasionally part of the side (fig. 43). The body of the leaf has generally distinctly-marked fibres going from the middle stem to the centre of the indentations, and often ending in a sort of triangle or circle, as in the incised slabs at St. Omer. It should also be remarked that the indentations are invariably distinctly separated from each other; and in drawing a leaf, it is always the best way to draw the indentations separately along the line of the edge of the leaf, and to add the body of the leaf afterwards. Occasionally we see a border or strip running across the leaf: in this case it can be ornamented with pearls, diamonds, &c. like any other border; as also can the stem of the leaf, or even the edges. In the eye of a scroll we generally find a flattened leaf trefoiled, or trefoiled and indented, or cinquefoiled; but it is usually supported by two or three other leaves, of which we have only a side view. A line or scroll occasionally ends by two or three side leaves springing from separate and parallel stalks.

Another point to be attended to is, that whenever a leaf springs from the end of a line or stalk, although the inner edge may spring from the centre of the stalk, so as to give it greater grace at the point of starting, still the stalk always continues itself in its full thickness, and butts up against the last lobe to give it strength—that great necessity of ornament. The theory of this would be that the leaf or flower is not at the end of the stalk, that the stalk continued much beyond the leaf, but has been cut off, the cut end being hidden by the said leaf or flower. Sometimes the stalk is so covered with leaves that we can see but very little of it. Occasionally two or three natural flowers and leaves may be introduced with the very best effect, as in the case of some of the Chertsey tiles; but then the designer has taken pains to make the stalk at least five or six times as thick as it would be in nature, and to cut up this stalk by sundry leaves placed upon it, the said leaves having their inner lobes or indentations supported in the manner above described (fig. 44). The borders and backgrounds of stained-glass windows, the encaustic tiles and the MSS. of the thirteenth century, will afford an almost exhaustless mine to the student of ornament, the only advice requisite being to study always from the objects themselves, and not from books. Stained glass, it is true, is very difficult to get at; but there are the Chertsey tiles (the very finest known) at the Architectural Museum, and an order to draw from the illuminated MSS. in the British Museum is not very difficult to obtain, while nothing can exceed the courtesy of the present officers and attendants.

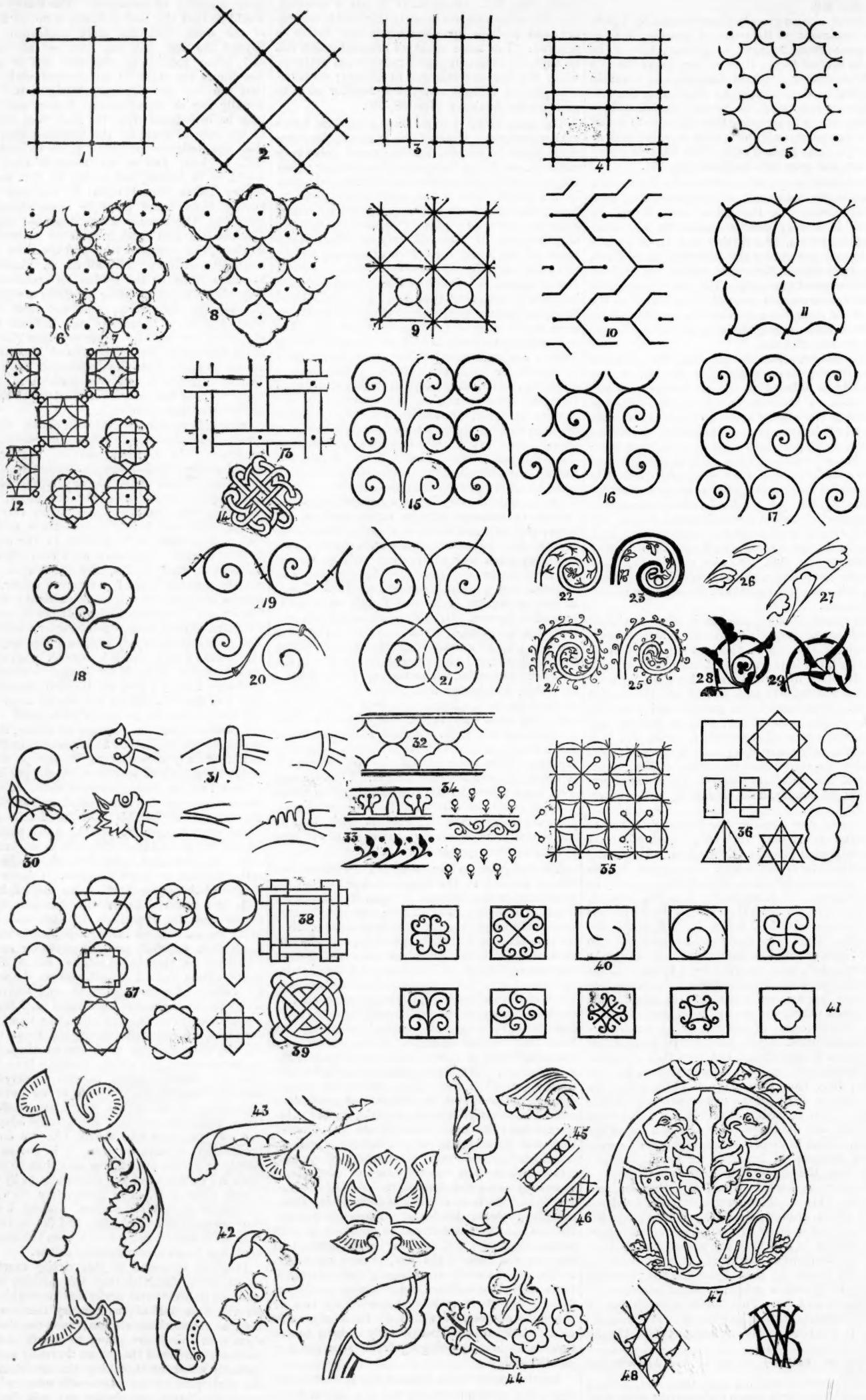
Animals and Birds.—Animals, again, are very much conventionalised when introduced into ornament. As to their position, they can be placed on the dots like the geometric forms, or in the fields of these latter, or in intervals between line diapers. Sometimes they are single, sometimes in pairs, sometimes *dos-à-dos*; very often an elaborate scroll is put between them, or foliage springs from them, or they occur in the convolutions of scrolls. In eastern work they often have patterns on their bodies, like the leaves, which contain another leaf of a separate colour. The details are also very conventionalised: thus, a lion's mane is represented by a diaper of lozenges, the point of each lozenge finishing in a little curl. The same remarks apply also, in a less degree, to the human figure, which it, indeed, behoves every ornamentist to study if he wishes to attain any thorough facility; for, as Haydon remarked, a man who draws a figure can always draw a leaf, but the converse by no means holds good. I have not touched upon the question of colour, for that is sufficiently important to demand a lecture for itself: it only concerns us in one point—viz., where the details of an object are not put in with a black line, in consequence of there being but two colours—one for the ground, and another for the ornament. In this case the details of the latter must be got by cutting away parts, and letting the ground show through, as on encaustic tiles; the ornament, therefore, should be made rather thicker, to allow for this. I have rather shortened the latter part of the subject, because it is less material to us than the principles of diaper and the disposition of lines and scrolls. With regard to these latter, indeed, it is not very likely that we shall produce anything new and which has not already been done; but as for the details, when we look around, and see the wonderful variety of animals, flowers, and leaves with which the good Creator has blessed us, I think we ought to set to work and strike out a new line for ourselves, by conventionalising all these various objects, thus making good use of them in the proper manner; not merely taking a branch of a tree, and simply copying it with a curved stem instead of with a straight one, as we have been accustomed to do of late years, but, on the contrary, bestowing our best thoughts to adapt it to our own purposes and wants, like we do other productions of nature; thus, it is not sufficient simply to flatten out a flower, and then to work or draw it: we must get new combinations by taking a side view of it, or a perspective view, or a section, or parts of the section. Indeed, I suspect that perspective and shading had far more to do than we generally believe with even the most conventional forms and systems of colour.

It is only by means of this strong exertion of our thinking faculties that this present age has attained its wonderful perfection in machinery,—for the first half of the century the world has been in its working clothes; however, there are signs that things are going to mend, and I am perfectly convinced that, if we do really and energetically set about it, taking the architecture of the early part of the thirteenth century as our *point de départ*, our future art will rival, and perhaps surpass, all that which has gone before it; for, as our poet tells us,—

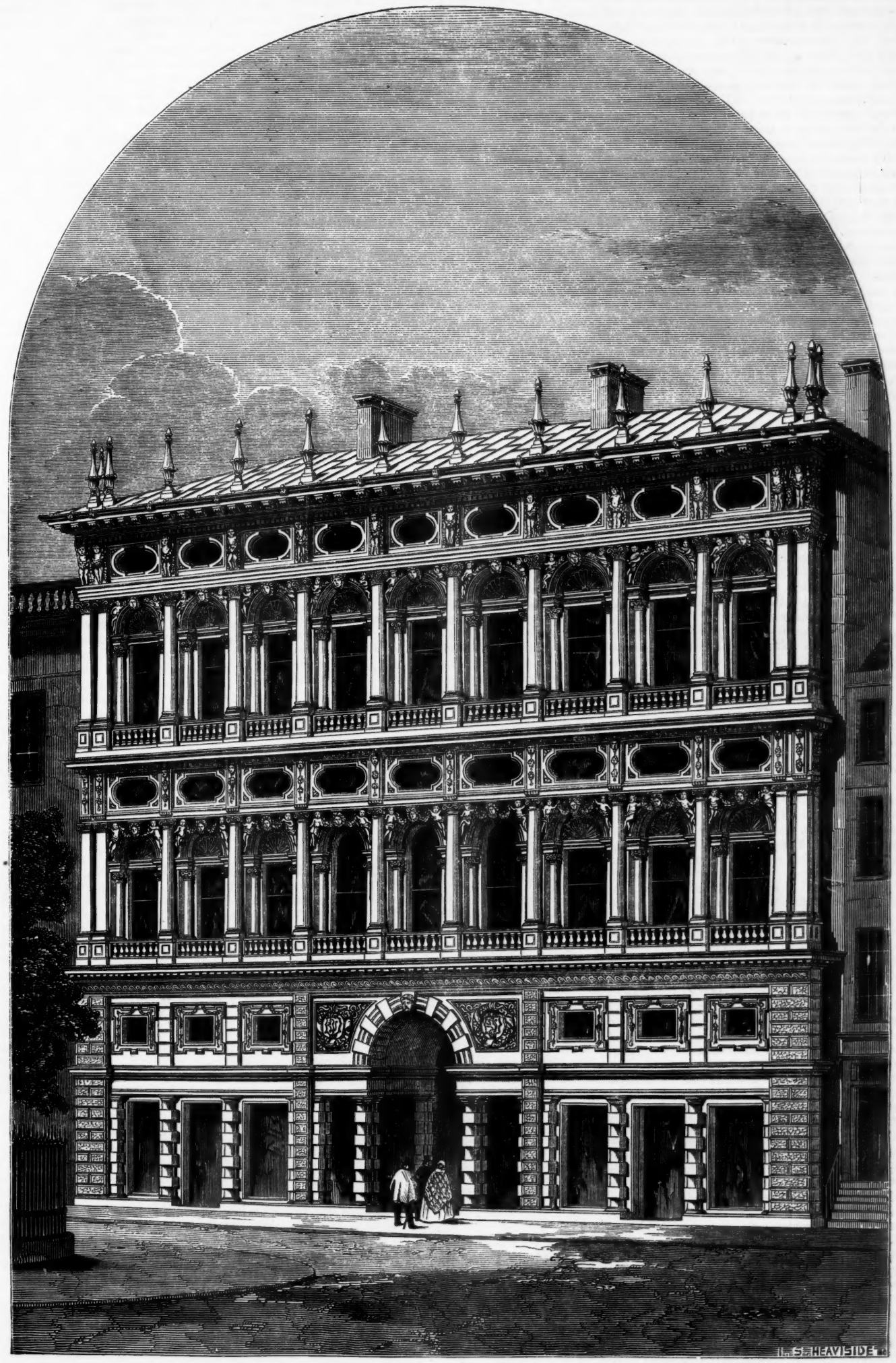
> "We are ancients of the earth,
> And in the morning of the times."

* See the Salisbury volume of the Archæological Institute.

† I suspect it was the same in good Greek art, only they managed the matter by means of the polychromatic decorations, whereas we did it by multiplying the stone details, our climate permitting very little external colour. It is Roman art, and above all what is called modern Italian, which is so different in its principles to the art of the thirteenth century.



CONSTRUCTION OF CONVENTIONAL ORNAMENT OF THE THIRTEENTH CENTURY.



LIFE ASSOCIATION OF SCOTLAND, EDINBURGH.——MR. DAVID RHIND, F.R.S.E. ARCHITECT.

LIFE ASSOCIATION OF SCOTLAND, EDINBURGH.

WITH the illustration of the building for this Association, which we publish to-day, it is not necessary to give any lengthened description, as our engraving speaks for itself. It is just being completed in Princes-street, one of the best situations in Edinburgh, with a fine southern exposure, and the advantage of a distant front view, from its being opposite the Mound and the Princes-street Gardens, some of the trees and enclosure of which are seen in our view.

There is a large loggia in the centre of the building, the circular-headed opening of which enters directly into the Life Association Office, while the small openings on either side of it enter respectively into an hotel and to rooms occupied as club chambers. There is also a large shop at each end of the building.

The interior of the Insurance Office consists of a large room for carrying on the general business of the office, with manager's, directors', and medical officer's rooms, waiting-rooms, &c. necessary for transacting life insurance business on a large scale.

The Insurance Office is expected to be ready to be occupied early this year. The other portions of the building are already in the occupation of different tenants.

The whole front is executed of Binny stone, a material well known as having been used in nearly all the public buildings lately erected in Edinburgh.

The modelling of the sculpture was by Mr. Thomas, of London; its execution by Mr. Handyside Ritchie, of Edinburgh.

The architect of the building is Mr. David Rhind, of Edinburgh. At first it was the intention to keep up the old shops, not even removing the ceiling; but, after progress had been made, this economy was found somewhat to interfere with and hamper the design, and brought about negotiations for changes in the detail which unfortunately for a time caused a want of unanimity between the architect and some of the parties interested in the work, chiefly regarding a difference of opinion about the use of *entresol* windows. This led to the architect putting himself into the hands of Sir Charles Barry, whose friendly assistance and decision speedily put an end to the difference that existed. The whole works have throughout been carried on by Mr. Rhind, and the selection of the style and the authorship of the general design are entirely his.

This explanation from Sir Charles Barry and Mr. Rhind would not have been so long,—indeed, would not have been necessary at all,—but for statements which have been elsewhere made.

SUPPLY OF WATER TO LONDON AND PARIS.*

LONDON is at present supplied with water by ten independent companies. The chief sources of supply are from the river Thames and the River Lea—five of the companies, with a daily supply of 35,372,782 gallons, being furnished by the former, while two companies, with a daily supply of 41,000,000 gallons, are furnished by the latter. The remaining three companies, with a supply of 4,653,000 gallons, are taken from the river Ravensbourne and the ponds and chalk wells of Hampstead, Plumstead, and Woolwich. The great power employed for its distribution is steam applied to pumping, amounting to a nominal power of 7,254 horses. The length of the mains and branches extends to 2,086 miles. The area of subsiding reservoirs extends to 141 acres, and of filter-beds to 40 acres. The number of houses supplied amounts to 328,561, and the gross quantity supplied per day reaches 81,025,842 gallons. The entire cost of the several works in the year 1856 was 7,102,823*l.* which shows that for every pound expended there is a daily supply of 11·4 gallons.

Few cities have improved their water supply in the course of a few years more than London, both in quantity and quality. In 1850 the whole number of houses supplied were only 270,581, whereas in 1856 water was furnished to 328,561 of the 340,000 houses which now form the aggregate within the Registrar-General's district; while the daily supply of water for all purposes, which in 1850 was 160 gallons per house, was in 1856 no less than 246 gallons. In 1857 the whole population within the bounds of supply amounted to 2,667,917, which leaves, after deducting one-sixth for trade purposes, 26 gallons for every individual, or, without deduction, 30·4 gallons. Previous to the passing of the Metropolis Water Act of 1852, considerably more than half of the supply was not filtered, the impurities in suspension being alone cleared by subsiding reservoirs. Now, however, no less than an area of 40 acres of filters has been added to these subsiding reservoirs. According to the chemical report of Messrs. Hoffman and Blyth, the waters now supplied to the whole metropolis contained not more than one-half of the organic matter which was present in these during the year 1851—a diminution of organic matter which, it appears, is neither due to the influence of the season nor to any difference in the mode of determining its quality in 1851 and 1856, but solely to the alteration of the localities from which many of the companies derive their present supply, and to the manifest improvement which has taken place in the collection, filtration, and general management of the supply of the metropolis. It has been stated by the Board of Health inspectors that the various companies have more than complied with the obligations placed upon them by the last Parliamentary Act, and have evinced a most anxious desire to discharge the duties imposed upon them for the public good. The only difficulty experienced in drawing supplies from such rivers as the Thames and Lea arises from the increased drainage operations pursued by the towns and villages situated on their banks, which, by discharging therein their polluted sewerage even above the improved sources of supply, threaten ere long to contaminate or destroy such an enormous supply of what is yet pure and sanitary, if measures be not immediately adopted, indeed, for the prevention of this growing evil—an evil which, by poisoning all large streams, cannot be remedied without a total abandonment of the whole present system of town drainage, and of turning the sewerage to some useful instead of deleterious purpose. This, indeed, is the great problem of the day; for while London at this moment can boast of a water supply commensurate with the just demands of its mighty population, it is at the same time threatened from the drainage which its abundant supply of water so greatly facilitates, with a pestilential evil, against which it is the imperative duty of every well-wisher for the comfort and health of the greatest metropolis in the world strennously to combat.

Let us now turn to the water supply, present and prospective, of the French capital, which, among its other late magnificent embellishments, has not been inattentive to the advantages of an improved supply of water.

Paris is at present supplied with water from various sources. The maintenance of the waterworks and the expense of distributing the water are paid by the municipality. The sources whence the supply are brought are—firstly, from the Canal d'Ourcque, by gravitation, which is 52 mètres above the level of the sea, and about 20 mètres above the lowest point of Paris; secondly, from the river Seine, whence it is pumped by steam-engines, and raised to the varied height of 75·30, 72, and 66·24 mètres above the level of the sea, and to 43·30, 40, and 34·24 mètres above the lowest levels of Paris; thirdly, from the artesian well of Grenelle, the basin of which is 90 mètres above the level of the sea; fourthly, from the aqueduct of Arcueil, the reservoir of which is 57·39 mètres above the level of the sea; and, fifthly, from sources to the north, which are at much greater elevation, but which, in respect of quantity, furnish but little water. The water d'Ourcque is distributed to all the low or less elevated quarters of the city, or to about two-thirds of the entire surface of the town: the others supply the higher districts. The total length of the principal conduits is 218,213 mètres: the length of the smaller pipeage extends to 190,048, or to a total of 408,254 lineal mètres, or about 253·6 English miles. The length of the conduits of the water d'Ourcque extends to 281,525 mètres, while all the others are only 126,729 mètres. The whole length of the streets of Paris is about 400,000 mètres, which is less than the extent of the pipeage; but there are many streets without water, while there are several with a double pipeage. It would require about 30,000 mètres of small pipeage to give water to all the streets of the capital. The daily quantity that can be at present sent into Paris, is as follows:—

Water d'Ourcque	102,000	mètres cube.
,, from Seine	30,000	,,
,, from Grenelle	950	,,
,, from Arcueil	700	,,
,, from northern sources	200	,,
	133,850	,,

or about 29,417,000 gallons.

The total quantity distributed varies considerably. During the hot weather of last year the consumpt rose to about 120,000 mètres cube, viz. from l'Ourcque about 100,000 mètres cube, and from other sources 20,000 mètres cube. In winter the consumpt diminished much, but never below 70,000 mètres cube. The number of houses within the boundaries of the water-supply of Paris, amount to upwards of 30,000, of which only 9,936 were, in December, 1857, supplied with pipes, showing that scarcely a third of these receive water directly. The population amounts to 1,093,262, and the number of the houses directly supplied with water being only a third of the whole, it follows that not more than 351,081 persons are enjoying the advantages of water within their houses. Assuming that 120,000 mètres cube, or 26,350,000 gallons, are sent daily into Paris, and that the population amounts to 1,100,000, it shows that there is a daily supply afforded of about twenty-four gallons to each individual inhabitant. The quantity, however, actually used for domestic purposes is, comparatively speaking, small. It has been calculated that the average daily quantity furnished to each house into which pipes are introduced into the court is about 1,444 *litres*, or very nearly ten gallons for each inhabitant in such houses. But the average quantity of water furnished to the whole city (one-fifth of the surface of which is above the level of the distributing reservoirs of the several sources) amounts only to 750 *litres* per day to each house, or to 5½ gallons per individual. It appears, in fact, that, between the *fontaines monumentales* and the purposes of trade and police, about three-fourths of the volume of water is consumed, and that little more than one-fourth is used for domestic purposes. It may be here remarked that the inhabitants of the French capital have not yet made use of water as an agent for carrying off the impurities of their houses into the sewers which debouch in the river, and, consequently, the Seine has not yet become, like the Thames, a great *cloaca maxima*, but is still pure—an ornament, and not a nuisance to the city. The peculiar character of the present sewerage of Paris is, that nothing but the rain and waste water of fountains, or other uncontaminated water, goes directly to the Seine, the soil, &c. of houses, being run into tanks attached to each building, which are cleaned out at certain times, and carried away to La Valette, beyond the bounds of the city.

It may be supposed strange that in such a city as Paris, where there is water in almost every leading street, and where it is given at a very low price to all who wish it, there should be so few proprietors who take it in. The explanation, however, is very simple, and arises from the two following causes:—First, the rich population continue, as formerly, to take the water for domestic purposes from the carriers of water, drawn from fountains, in which the water of the Seine is carefully filtered, and absolutely refuse to drink the water of the Ourcque Canal; while, secondly, the poor population avails itself of the 2,000 *bornes fontaines*, or pipes opening in the streets close to the kerbstone, and of the sixty-nine public fountains scattered throughout the city, whence any quantity of water required may be drawn, free of any cost. It appears that the market fountains, the state and the municipal establishments, consume about 13,000 *mètres* cube: the remainder, or 77,000 *mètres* cube, is expended on the streets and roads, through the *bornes fontaines* and the sixty-nine drawing and thirty-three monumental fountains, and, in fine, on the Bois de Boulogne, where there is alone not less than 16,000 *mètres* cube expended. In throwing so large a volume of water along the public thoroughfares, and in permitting the drawing of supplies from so many openings, the municipality has not succeeded in the end which they proposed to attain. If these public openings were suppressed, the proprietors of houses would each and all be forced to become recipients of water from the city, enabling their tenants thereby to draw water in the courts instead of seeking it in the street, while the street would be freed from two running gutters which line each of the foot pavements. Up to this moment all the water introduced into houses is drawn from stop-cocks placed in the courts, the proprietors having obstinately refused to distribute it throughout the interior of their property, fearing, as they say, the accidents which might arise from the negligence of their tenants. What the present cost of the water supply of Paris has been it is difficult to say. Certain of the works have existed for 250 years, while the Canal d'Ourcque, which affords the greatest supply, was formed for navigation purposes, for which it is still chiefly used. According to the valuation of M. Belgrand, the chief engineer of the present and projected works, we

* From a paper by Dr. Strang, read at the British Association for the Advancement of Science, Leeds.

may assume the cost of the existing works at about 20,000,000 francs, or 800,000*l.* sterling; and taking the daily quantity of water that is sent into Paris to be 26,350,000 gallons, it follows that for every 1*l.* expended there is provided a daily supply of about thirty-three gallons. To meet the interest of this cost and annual expenditure there is no special tax or forced rate, proprietors being free to take or not, as they please, the water of the city; but those who take it into their houses pay a very small annual charge. The gross receipts from water paid annually to the municipality in 1857 was only 1,276,550 francs, while there was received from the fountains where the filtered water of the Seine is sold 390,499 francs, or a total of 1,666,950 francs, or 66,680*l.* sterling.

DISFIGUREMENTS THROUGH THE WINDOW.

DAMAGE is often done to the artistic appearance of the interiors of some of our most important buildings by the unpleasant views which obtrude themselves through the windows. Unfortunately, architects cannot always, particularly in large towns, choose such outward prospects as will correspond with the style of their buildings. We might mention many structures on which large sums have been expended, which are disfigured by the views seen through the windows; and in no instance is this defect more evident than in the British Museum, that great storehouse of the most rare and choice art works of many ages.

In the sculpture gallery, and other parts, the eye is offended by peeps at the exterior of the Reading-room, which is rough, and not intended to meet the eye: there are also scaffold-poles and other matters which destroy the effect of the architectural decorations. The windows in the British Museum, as they are at present arranged, are an evident disfigurement; and yet this might be prevented by the use of slightly dulled glass; and when, for the purpose of ventilation in the summer time, it is necessary to open the windows, the objectionable out-view might be hidden by properly contrived blinds, which would answer this purpose as well as admit a sufficient current for ventilation. It may be thought by some that such an alteration as this now recommended would prevent a sufficient admission of light: in a sculpture gallery, however, it is more desirable to have a subdued and steady light than the glare which now exists in bright weather.

While mentioning this, and acknowledging the great improvements which have been recently made, it is worth while to suggest that some of the most important of the Greek statues are not well placed. The famous Venus should be in some situation where it could either be foiled by a background of suitable colour, or where its beautiful proportions would not be interfered with by the flutings of a column, or by other objects.

THE ESSEX ARCHÆOLOGICAL SOCIETY.

A MEETING of the members and friends of this institution was held at Stratford, on the 9th ult., when several papers relating to antiquarian matters in the locality were read. The Rev. Guy Bryan took the chair.

A paper on the ancient history of Stratford, prepared by a member, and read by the Rev. A. J. Ram, stated that in Saxon, if not in Roman, times, the highway from London into the eastern parts of England passed very near their present place of meeting. It crossed the Lea at the place still known as Old Ford; and from this road (or, in Saxon parlance, street), by the Ford, is derived the name of the modern town of Stratford. It probably soon branched off—one way leading the traveller through the forest to the ford in the wood, where Woodford-bridge is now; another tending more to the east, passing the river Roden by the Ilford. The legend of the removal of the body of St. Erkenwald (fourth Bishop of London, and founder of Barking Abbey) from the latter place to London, in A.D. 685, was considered by some topographers as the earliest mention of this road. The *district* through which it passed was called by the Saxons, Ham, meaning home or village. It included the whole of the present parishes of East and West Ham, marsh, arable, and forest. At the close of the paper it was remarked that in April, 1636, Forest Courts were held at Stratford. Charles I. desired to revive the old forest laws, in the hope, as is supposed, to obtain a revenue independent of parliament. Clamour and discontent ensued. The Solicitor-general demanded, in the name of the Crown, that the fences should be kept up *no higher than a doe and her fawn could go over.* Such a regulation enforced from Bow-bridge to Colchester would destroy the agriculture of half the county. Thus was enacted at Stratford one of those fatal mistakes of the reign of Charles I. that produced the civil war, led to his own death, and the ultimate fall of his dynasty. At this point modern history may be said to commence. Here, therefore, this sketch of the "Early history of Stratford and some of the surrounding villages" comes to its close.

Mr. R. H. Clutterbuck read "An Account of the Abbey of West Ham, otherwise Stratford Langthorne." He first quoted a statement in Weever's Funeral Monuments, published in 1631, that "Queene Maud, wife to Henry I. passing over the River of Leue, at Old Forde, hardly escaped danger of drowning; after which shee gave order that a little beneath at Stratforde there should be a bridge made over the water,—going over which to West Ham I saw the remaines of a monastrie, pleasantly watered with several streames;" and mentioned that the site of the Abbey of St. Mary, here referred to, was now occupied by a silk-printing work. The history of West Ham Church is intimately connected with the abbey, having been given to the monastery by the son of the founder. After describing the general arrangements of Cistercian monasteries, the paper proceeded to notice the few remains of the monastery and its probable extent and character. In 1845, in excavating for the Woolwich railway, the workmen lighted upon some interesting remains of the abbey, apparently the lavatory, with a well from which the supply of water was obtained. In conclusion, Mr. Clutterbuck said he could not leave the subject without expressing regret at the ruthless annihilation of almost all the remains of our conventual buildings; and a hope that this meeting, and the society's proceedings generally, might diffuse a sufficient amount of reverence for ancient things to prevent any of the remains which still adorn the county from sharing the fate of those of the Abbey of St. Mary, Stratford.

A paper on the Church of East Ham was read by Mr. H. W. King. The church, he said, was a perfect Norman structure throughout, and of somewhat unusual plan, consisting of nave, chancel, and sanctuary, sometimes described as a double chancel. He then proceeded to give a minute description of the various parts of the building in their present and original state; and strongly denounced the use of "Compo," with which the recently-erected porch, and also the tower, are coated, as "a wretched modern imitation of stone which has been brought extensively into use in this age of sham and unreality, partly for the purpose of hiding bad work, and partly for the purpose of producing a neat, showy, perhaps a grand, exterior at a small cost, but at the entire sacrifice of artistic skill, propriety, and good taste, and which ought to be condemned wherever it is seen, whether in an ecclesiastical or domestic edifice, or even in a shop frontage."

Mr. H. W. King read a paper on Bow-bridge, in which he enlarged upon several of the points mentioned in the early history of Stratford.

A conversation followed the reading of the papers.

The Rev. Walter Field, F.S.A. called attention to some Roman remains (fragments of pottery and bones of animals) which had been discovered that day at the Cemetery at North Ockendon. Mr. Field was of opinion that the place was the site of an ancient British barrow.

Mr. R. H. Clutterbuck gave a description of many of the antiquities arranged for exhibition.

The Rev. E. L. Cutts reminded the meeting that the most perfect remains of Roman walls in England were to be found at Colchester, and therefore, he said, they had reason to take especial interest in the remains of Roman walls in France, which are even more perfect than those at home. This led him to direct their attention to the little town of Dax, mentioned in our last, which lies between Bayonne and Bordeaux. Until recently it was a fortified town, but the fortifications had been given up, and the local authorities, who had been permitted to do what they pleased with the walls, proposed to level them. However, before permission was given to do this, an architect was sent to survey them. He reported that they consisted of Mediæval repairs of old Roman walls. Since then they had been inspected by an eminent French antiquary, and also by Mr. Charles Roach Smith, who reported them to be the most perfect remains of Roman walls existing in the ancient province of Gaul—more perfect than anything that could be found in England—and that therefore they ought to be preserved. The rev. gentleman also announced that the general annual meeting will take place next year at Saffron Walden, before which, however, a meeting of the society will probably be held at Barking.

GLASGOW ARCHITECTURAL SOCIETY.

AT a meeting of this society held on the 21st of December, Mr. John M'Dowall in the chair, a paper was read by Mr. John Honeyman, jun., architect, "On the Drainage of Glasgow, with special Reference to the Disinfection of Sewage and the Ventilation of Sewers."

The writer very properly dwelt on the necessity of ventilating sewers: the drains must themselves be drained of sewage gases; and he showed that in the present state of the sewers of Glasgow the sanitary condition of the city would not be materially improved by the purification of the Clyde. He urged that, for the efficient drainage of Glasgow, were required, first of all, well constructed sewers, both as to form, size, and gradient; secondly, clean sewers and the disinfection of the sewage by means of a continual system of flushing, so that putrefication and the consequent evolution of noxious gases in the sewers might be prevented; and, thirdly, well-ventilated sewers, so that in the event of injurious exhalations rising from the sewage they might be disposed of in such a way as not to be obnoxious to health; and he submitted that if such a system were in operation it would practically be of no consequence what manner of filth the sewers contained. It would all be speedily got rid of, and without being permitted to affect comfort in any degree. There would, therefore, be no excuse whatever for abandoning the water-closet system, except the introduction of some apparatus superior in cleanliness and convenience.

At the close, Mr. Carrick, superintendent of streets, mentioned that in several instances he had been obliged to remove traps from gullies to prevent the traps of the house drains in their neighbourhood from being forced, and that the houses, in fact, would not have been habitable unless he had done so, showing the necessity of combining ventilation and trapping.

The Chairman stated that during the whole year at no time had the slightest smell risen from the Clyde except on one occasion, and then only for one or two days.

CHURCH-BUILDING NEWS.

Lincoln.—The Rev. Augustus Sutton, and Mr. H. Sutton (sons of the late Sir Richard Sutton, bart.) lately placed a stained glass window in the chapel of St. Paul in the south arm of the lesser or eastern transept of Lincoln Cathedral. They have since extended their contributions to the ornamentation of the cathedral by placing in the adjoining chapel—that founded by Joan Cantilupe—a window intended to be a companion to that already alluded to. The subject is "The Life of Elisha," and is, as it were, a continuation of the subject of the other window—"The Life of Elijah." It has six distinct illustrations, viz.,—"The Mantle of Elijah falling upon Elisha;" "The Sons of the Prophets coming to Elisha;" "Elisha healing the bitter Water;" "Elisha raising the Shunammite's Son;" and "Gehazi coming Home to Elisha after being despatched to Naaman." Beneath the apex of the window is the monogram of the Sutton family, with the coat of arms at the bottom.

Norwich.—The extensive repairs which St. James's Church, Norwich, has been undergoing are sufficiently advanced to admit of its now being re-opened. For some time past the church had been in a most dangerous state, and the appearance of the interior was so alarming as to deter many from entering it. The evident settlement in the chancel arches at length made it necessary that immediate steps should be taken for their reparation. The arches were accordingly removed and rebuilt. The western arches have also been tied and strengthened; the roofs opened and repaired, and several other works essentially important to the safety of the fabric executed. The expense has been entirely defrayed by voluntary subscriptions, but there is yet a considerable balance to be obtained.

Heigham.—Much has been done, says the *Norfolk Chronicle*, but much still remains to be done, towards obtaining the requisite amount for building the proposed new church on the Unthank's-road. The sum actually in hand and promised is about 3,600*l.* to which, if what may be hoped and expected from various Church Extension Societies, be added, there is probably a total of 4,300*l.* or 4,400*l.* to be relied upon. But at least 6,000*l.* are needed.

Rochester.—St. Peter's Church, King-street,

Troy-town, is advancing towards completion. The exterior walls are up, ready for the roof, those for the nave being carried to a height of 40 feet from the floor. The timber framings for the nave roof are being hoisted on the walls, and the roof for the aisle is also in a forward state. It is expected that the entire building will be roofed before the end of this month. The building is a combination of red, white, and grey brick dressings, with Kentish ragstone. The contractor is Mr. A. Stump, who has just handed over the Soldiers' Wives Nursery at Brompton, built by him for the Rev. D. Cooke, and also the model canteen at the Hut-barracks, erected for Mr. J. Budden.

Hawkhurst.—An offer has been made by the Rev. H. A Jeffreys to build and endow a new church at High-gate, the most central part of the parish. The site is selected, and the material for the edifice is to be the sandstone of the neighbourhood. The ground has been given by Mr. Joseph Jennings, the owner of an adjoining estate. The stone also has been offered by Thomas Ayerst, esq. When the new church shall have been completed, and the houses now in course of erection finished, this part of the parish will be much improved. A few perches were sold by public auction some months since, at the rate of more than 900*l.* per acre. It was proposed to accommodate the entire congregation on the floor of the old church, for which more than a thousand sittings were to be provided. The erection of a new church, however, will give the opportunity for an enlargement of the seats. The galleries and high pews are all cleared away, and temporary sittings of tolerably uniform appearance, manufactured for the occasion out of the old materials, have taken their places, and the warming apparatus is just got into working order. Mr. Edward Loyd, jun. has presented a suitable organ to the church, which will be erected as soon as circumstances will permit. While the workmen were removing the earth preparatory to the laying down of the hot water pipes, they discovered the foundations of what was no doubt the original church, some four or five feet within the walls of the present one. These are of a very solid and durable kind, but neither the cause nor the date of the enlargement appears to be known.

West Tarring.—The church here has now in erection, by Mr. G. Cook, of Worthing, a stained glass memorial window, at the east end of the north aisle, to the memory of the late Ann Barker, Broadwater. It is a two-light window, with pointed arches, and a rounded cross between. The subject is the "Resurrection and Ascension," and on the circular cross, between the pointed arches, is the Lamb, surrounded with the words, "I know that my Redeemer liveth." The whole corresponds with a window in the south aisle in memory of Mr. Lucas, of Heene, who bequeathed a donation to be expended on the church, which led to a general repair, and a new peal of six bells.

Winchester.—The restoration of the southern part of the west front of Winchester cathedral is nearly completed, under the superintendence of Mr. J. Colson, architect, and Mr. Gillingham, statuary, both of this city, and it is hoped the other portions of the front will soon be similarly treated by the Ecclesiastical Commissioners, so as to lose all traces of the abominations committed by the dean and chapter, in bedaubing that part of the fabric with Roman cement.

Rock.—An effort is being made towards the restoration of the parish church here. The rector, at a parish meeting held on the 17th December, stated that he was then in a position to guarantee 500*l.* in furtherance of this object, and that an offer of 250*l.* more had been conditionally made by a friend; so that more than half of the estimated cost of the restoration is provided, and an appeal is now made to the landowners and general body of the parishioners. Rock church has a chancel, with large south chapel and western tower, and remains of Norman work, especially the chancel arch, and the north doorway. The south wall of the church and the tower belong to the Perpendicular period, having been rebuilt by one of the Coningsby family in 1510; but although this work is not so old by some centuries as the Norman remains, it is in a much more dilapidated state, the south wall having long been cramped with iron. The building has been greatly disfigured at various periods of its history: whitewash and plaster have done their work: deal galleries, bad pewing, wooden partitions, and other eyesores abound; the whole of which it is now contemplated to remove.

Alcester.—A new organ has been opened in the church of Alcester. The builder of the instrument is Mr. Hewins, of Stratford-upon-Avon.

Church Fenton.—The church at Church Fenton has been reopened for divine service, having undergone extensive internal repairs. The roof has been plastered between the spars, and coloured with ultra-marine blue. The whole of the old floor has been removed, and the ground excavated two feet, a space which has since been filled up with concrete, upon which the pavement has been relaid. The walls of the edifice have been divested of their coat of whitewash, and the masonry, where requisite, repaired. The old pews have been removed, and substituted by open stalls. The pulpit and reading-desk are also new, as well as the communion rails, which, in addition, have been fitted with ornamental upright bronze standards. A new three-light window has been introduced into the west end of the building, the gift of Mr. Weatherley, the contractor for the restoration. The window, which is of the geometrical pattern, is filled with stained glass, and has been manufactured by Messrs. W. and T. Hodgson. The organ is new from the manufactory of Mr. Postill. The churchyard has been excavated to the depth of two feet round the building, so as to remove the dampness from the walls. The architect employed was Mr. A. Salvin, of London. The woodwork was executed by Mr. Lawson, of Holdgate, for Mr. Weatherley. The restoration has been effected through the liberality of the late vicar, the Rev. W. B. Taylor, who left 700*l.* for the purpose.

FOREIGN RAILWAYS AND OTHER WORKS.

THE Charleville and Sedan Railway was inspected on Thursday last, by the Committee of Engineers appointed by the Minister of Public Works. The principal structures on that section of the Ardennes Railway are two bridges over the Meuse. This line is to be open for public traffic on the 14th inst. as far as Douchery, a small town on the Meuse, about two miles from Sedan.

The receipts of the French Railway Companies during the present year will probably exceed 350 millions of francs. The companies have to pay at this moment about 115 millions of francs for interest on their bonds, and if their working and other expenses are estimated at 50 per cent. on their receipts, or 150 millions, there will remain 85 millions to be divided among the shareholders.

The French press states that the subscription for shares to the Isthmus of Suez Canal has closed. It was proposed to reserve 80,000 shares, representing 40,000,000f. for the total capital of France, but in France alone 250,000 shares have been subscribed for. As Egypt and Turkey had subscribed for 150,000 shares, the total of 400,000f. is already made up. The subscriptions of Austria, Russia, Holland, the United States, Spain, Italy, Belgium, Switzerland, and Germany, for which 40,000 shares were reserved, are not yet known.

The Frankfort paper states that a large railway bridge, near Creutznach, fell on the night of the 28th ult. in consequence of the inundations of the Nahe River.

While waiting for the completion of the Spanish railways to develop the rich resources of the Bordeaux and Bayonne countries, their construction has already opened an important channel to the products of these districts. The Northern Spanish Railway Company has just made the adjudication of a contract for the supply of 300,000 sleepers of pine, from the Landes, prepared by the process of M. Boucherie, to be delivered in the course of the year 1859. Without the help of these railways, and the farm roads of Bayonne, such a considerable development of the timber of this district would have been impossible.

WORKS IN IRELAND.

A NEW railway terminus is to be built at Enniskillen, for the Dundalk and Enniskillen Railway Company. It consists of a central building, two stories high, with projecting wings, and containing on lower floor a booking-office 30 by 17, off which are situated in one wing a waiting-room and luggage store; and in the other, ladies' waiting-room, master's kitchen, &c. One-story buildings at either side respectively comprehend 1st, 2nd, and 3rd class refreshment-rooms and kitchen; and superintendent's office, porter's room, lamp-stores, water closets, &c. &c. On first floor are two suites of apartments for locomotive superintendent, and station master, containing parlours, bed-rooms, kitchens, &c. The central building extends 68 feet, has segmental headed opes, with sandstone dressings, a central doorway, covered way, and cantilever roof. The total length is 184 feet. The platform is 21·9 wide at centre of building, and 15·0 throughout. The structure when completed will be of important and tasteful character. Mr. William Murray is the architect.

The Lady Chapel in the cathedral at Killarney (designed by the late Mr. Pugin, and now being completed under the direction of Mr. M'Carthy, architect), is being decorated by Mr. Barff, at the expense of Lord Castlerosse and the Countess of Kenmare. Stained glass windows are being erected, and in the south transept one is completed on which the Royal Psalmist, Isaias, St. Joseph, and St. John are represented on the higher lights: on the second are SS. Augustine, Ambrose, and Stephen; and on the lower SS. Francis, Ignatius, Alphonsus, and the present Pontiff Pio IX. These lights are surmounted by a circular light, which represents the Virgin surrounded by angels. The altar is being constructed by Mr. Lane, from the architect's designs. An altar decorated with Mosaic has also been erected in the Sacrament Chapel.

A new church, to accommodate 1,500 of the Molyneux Congregation, is to be built at Dublin, at a cost of 7,000*l.*: we hear also of a proposed new church at Rathgan, near the same city.

Mr. Meares is declared the contractor for the new buildings to be erected for the Society of St. Vincent de Paul, according to the drawings of Mr. John S. Butler, architect, to whom was awarded the first prize in a recent competition.

A glebe house has been lately completed at Violet Hill, near Enniskillen, for the Rev. Josiah Crampton, according to plans by Messrs. Carmichael and Jones, architects; Mr. Hugh Kelly, T.C., builder. The style is Tudorized Gothic; pointed gables, high-pitched roof, mullioned, transomed, and hood-moulded windows being chief features. Interiorly it comprises the ordinary arrangements of a dwelling-house.

Contracts are about being entered into for the erection of a new and important District Model National School at Derry. The design is early English with rubble walling and Scotch stone dressings.

A new monumental chapel in the Gothic style, in chiselled limestone, with buttresses, handsome entrance doorway, traceried window, and gabled ends, has been erected in Glasnevin Cemetery, near Dublin, from designs by Mr. M'Carthy. An entrance, said to be ostentatious and inappropriate, has been made in the same cemetery to the O'Connell monument (a round tower 170 feet high), designed by Dr. Petrie, and previously fully described. A stained glass window to the memory of some members of the Goold family, including the late Wyndham Goold, M.P., has been erected in the new church of Attea, county Limerick, designed by Mr. Fogerty, architect, and built at the expense of Archdeacon Goold. Messrs. Sillery, of Dublin, were the manufacturers.

THE "PEOPLE'S FREE" PARK AT BIRMINGHAM.

ASTON Hall and Park, which the Birmingham people induced her Majesty and the British public to believe had been "subscribed for by the people" of Birmingham, and to inaugurate which, in great state, her Majesty was persuaded to visit Birmingham, now becomes the subject of some rather curious disclosures. "Nearly all the money," it appears, is still unprovided for. The Queen's presence, ostensibly for the purpose of inaugurating a work already done, was really intended "to promote the success" of the scheme by "*benefits* to be legitimately derived" from her Majesty's visit: in short, this star of the first magnitude was to "draw" such a multitude into the grounds, at so much a head, that the "people" of Birmingham were to pay for their park, or something like it, by virtue of the Queen's "attraction." But, unfortunately for this scheme, her Majesty did not "draw:" "there were not more *people* to greet her Majesty *in* the park than there are on many ordinary occasions." Mr. Thomas Lloyd has the penetration, somewhat rare it would seem, to perceive that this Brummagem style of doing the thing is "a great disgrace" to the town—at all events, that the failure of the scheme will be so; and he appeals to the "thrice mayor" to "pay up" for his knighthood on that celebrated occasion by heading a grand subscription-list, in course of which Mr. Lloyd himself offers humbly to "follow" suit "at some distance" with the small sum of "1,000*l.*" *if* the working people of Birmingham subscribe 5,000*l.* out of the 18,000*l.* or at the very least 10,000*l.* which is "immediately" required, to prevent a catastrophe that is now imminent. "It is your cause," says Mr. Lloyd, addressing the mayor. "The Queen's visit is to you [and why not to the whole town as well?] made memorable by the honour you re-

ceived on that great occasion. To you, therefore we look for help. Assist us with your purse, and, more than all, with your example," &c.; and "every one who took part in the reception of the Queen did promise ['to the Queen'] to make Aston Park a free park." Yet "it is a workmen's affair," too, although the workmen seem to have been, admittedly, the only party who "have done well;" but their names having been taken in the matter, they are hence also called upon to pay up for that over again, like the knighted mayor, and thus save the shabby corporation from opening the park free to their constituents—the people. The influential class of Birmingham would seem to have wished to acquire a park as meanly as they realized a town-hall some years since. The Birminghamites have, at this moment, another grand scheme in hand. They propose to collect a fund of 2,000*l.* "for a statue of the Queen, to commemorate the royal visit," and have already realized 103*l.* of the requisite sum. Could they not turn her Majesty, *in propriâ personâ*, to account, and make her both "draw" and "pay" for her statue? Pending the requisite arrangements, they had better see to the collection of the 18,000*l.* for the People's Free Park.

CONCRETE BUILDING IN FRANCE.

IT is stated that in the camp of Chalons a new species of building material was employed some months back—namely, a mixture of lime, sand, or earth, and a peculiar species of cement, being, it is said, 60 per cent. cheaper than other materials, and of remarkable solidity. It struck the emperor that perhaps the same material could be employed in the construction of a port which it is proposed to form at Saint Jean de Luz, and which, it is estimated, will cost 30,000,000 francs. On being consulted, the inventor said that his material would do for the purpose, but he could not tell what chemical influence sea water would have on it. The emperor immediately gave orders that experiments should be made, and gave 10,000f. from his privy purse for that purpose. The inventor, with several men and the necessary implements, arrived a few days ago at Saint Jean de Luz, and is now making blocks six mètres square by means of a mixture of sand from the beach (qy. and beach stones?), lime, and of his cement. These blocks, when hard, are to be cast into the sea, and are to remain there till next autumn, when the emperor himself, in the course of his annual stay at Biarritz, will examine them to see the influence of the salt water. If the new material should be found to answer, the projected port, the accounts go on to say, would only cost 6,000,000f. instead of 30,000,000f.

DECISIONS UNDER METROPOLITAN BUILDING ACT.

Marylebone Police-office.— Richard Holding, builder, was summoned by Mr. Baker, district surveyor of St. Pancras, for constructing habitable rooms less than 7 feet in height, in the roofs of nine houses in Inkerman-road, Kentish-town. The surveyor produced a plan and section of the rooms, which were 6 feet 6 inches in the highest part, and 2 feet 10 inches only in the lowest, and gave evidence that they were entirely contrary to the twenty-third section of the Act: they contained but 170 cubic feet of space or air, and were wholly unfit for occupation: and to prove that they were not only habitable, but actually inhabited, he called one of the tenants, who proved that the defendant had induced him to take the house by vaunting the "great convenience" of these berths, and that his servant had slept there nightly in consequence. The defendant denied that he built the places for sleeping in, but for cupboards or store-rooms, and contended that, on account of their very small area and height, it was impossible he could ever have intended them to be inhabited within the meaning of the Act. The magistrate, Mr. Long, adopted this view, and discharged the complaint, because he could not believe it likely that such holes were meant for occupation, although it had been proved that as soon as the houses were let, the holes, nevertheless, were actually occupied. He thought the penalty was upon the tenant, and not upon the builder: so he cautioned the former, but let the latter go free.*

Westminster Police-court.— Henry Smith, of Layham-place, South Lambeth, bricklayer, was summoned to the Westminster Police-court, on Thursday, the 23rd of December, and fined twenty shillings and costs, for not giving notice to the district surveyor of South Kensington, of rebuilding an addition to the premises, No. 12, Queen's-buildings, Fulham-road.

Clerkenwell.— James Thorn, bricklayer, was charged with neglecting to give the district surveyor of St. Pancras due notice of works at No. 2, Leigh-street, Burton-crescent, whereby he had become liable to a penalty of 20*l.* Mr. Baker stated that the defendant had erected a stove on the top story of the house, without cutting away the joists or floor-boards, and had carried up an earthenware flue through the ceiling and roof, contiguous to the timbers and boarding. The whole was very dangerous, and it was just one of those cases which the Metropolitan Board had, by a recent special circular to the district surveyors, required them to prosecute in the most stringent manner. In consideration, however, of the defendant having at once removed the stove and pipe on the complaint of the surveyor, the magistrate, Mr. Corrie, would not impose any penalty, but desired him to pay 2*s.* costs.

William Carr was also summoned for a like offence, in having built over the yard at 34, Aldenham-terrace, without notice. He was fined 5*s.* and costs.

James Tilbury appeared in answer to a complaint for irregularly building a public concert-room in Middlesex-street, Somer's-town, in so slight and insubstantial a manner as to be almost dangerous, and no part of which had been approved by the district surveyor, as required by section 30. Mr. Baker stated that the building covered 1,600 superficial feet, and was built for the ostensible purpose of a lay-stall or stable, for which use the notice had been given; but that, soon after it had been covered in, the defendant fitted it up as a penny theatre, and converted it into a public building, for which the walls, roof, floor, and galleries were wholly unadapted. The magistrate, Mr. Corrie, said he had heard of this nuisance before, from the circumstance of having seen many of the audience—young thieves and vagabonds—on his own stage. He severely admonished the defendant, and made a peremptory order upon him to comply with the requisitions of the district surveyor within ten days.

STRIKE OF WORKMEN.

AT the Marylebone police court, last week, Frederick Nash, a carpenter, appeared to answer a summons which had been obtained against him upon a written information, made upon oath, in compliance with the requirements of the Act 6 Geo. 4, cap. 129, sec. 3, better known as the Intimidation Act. The information laid in the summons was, that he did, on the 14th December instant, make use of such threats towards George Whitlock, also that he was so intimidated as to be prevented from going to work.

Mr. Herring, solicitor, appeared for the complainants, and Mr. Lewis, junior, for the defendant.

Mr. Herring, in opening the case, said he appeared for Mr. Henry Brunow Austin, a builder in the parish of Paddington, and who employed between 300 and 400 men. Last Monday week these men thought proper to go upon strike. Mr. Austin had been in the habit of letting his men work for nine hours a day, for which he paid 5*s.* In consequence of not allowing fires in his buildings and the shortness of the days, he only let them work eight hours, for which he paid them 4*s.* 6*d.* Last Monday week, Whitlock and another man, hearing that Mr. Austin was in want of men, applied for work. After coming out of the building into which they had been, and when crossing the road, near a public house, they were called to by the defendant, and told that "if they went to work, they would be pulled out of the b—— building." The two men then went back and acquainted the clerk of the works with the language and threats that had been held out to them if they went to work. He came out with them for the purpose of having the man who had used the threats to be pointed out to him, when the defendant was identified as the man, and upon his being spoken to he said that he had done no more than the rest of the men who were out. As regarded punishment, Mr. Austin had no vindictive feeling in the matter. He only wished these men to return to their employ. The defendant was liable to three months' hard labour; but his client did not wish for that, he only wanted the men to return peaceably to their employ.

Evidence being given,

Mr. Broughton said,—with regard to the summons, I find, upon looking over the Act, that the wording of it is not quite good. The Act says;—"Preventing or endeavouring to prevent." This summons in this case is not made out so: it merely says, "preventing," which in fact was not the case, for it appears the man has been to work for Mr. Austin. As it is not properly made out, I should advise the prosecutor to withdraw, and he can have another summons to amend this.

The prosecution was accordingly withdrawn, and the summons dismissed.

RECENT BUILDING PATENTS.*

APPARATUS FOR BAKING FIRE-BRICK CLAY. Dated May 26, 1858.—A communication.—*Jose Luis*, Welbeck-street, Cavendish-square, London.—This apparatus can be made according to a given dimension, the largest size possible being from 45 feet to 48 feet of entire surface, that is, from the base to the centre of the arch. In an apparatus of this dimension more than a ton of clay can be baked at each burning. The burning lasts four hours, including the filling of and emptying the furnace. The same apparatus can be used for baking the sand, of which a certain proportion is employed to prevent shrinking in making fire-bricks. The advantages are thus described:—"Firstly, it economises 75 per cent. on the time, and 60 per cent. on the actual expense of baking the bricks. The clay baked by this apparatus makes a much better and more cohesive paste, and when made into the different articles of trade, does not crack on a transition from hot to cold, or the reverse: it is also much less liable to breakage. By using this apparatus an economy of 50 per cent. is effected in the manufacture of steel (where it is used at once for the powdered matters baked and unbaked), and in all ovens of high temperature."

FLOORING CRAMP. Dated May 26, 1858.—*George Cheadle*, Wolverhampton.—This consists of a flooring cramp in which the mechanism for compressing the boards is actuated by a worm and worm-wheel, the said worm-wheel being situated upon the axis of the screw from which the compressing bolt or ram derives its motion.

SKYLIGHTS AND GLASS ROOFING. Dated May 28, 1858.—*Charles Stanley and Joseph Fittall*, Birmingham.—This invention consists in giving the glass plates used for skylights and glass roofing a trough-like figure, the said trough-like plates being supported and fixed on suitably shaped bars or framing, by means of clips or clamps engaging with the said plates, the said clips or clamps being fixed on the bars or framing.

STOVES AND FIREPLACES. Dated May 3, 1858.—*John Taylor*, Roupell-park, Streatham-hill, Surrey.—This invention has for its object improvements in stoves and fireplaces, and consists in arranging them so that they may either be worked as ordinary stoves or fireplaces, the smoke and products of combustion rising from the ignited fuel passing directly to the chimney; or, by closing the direct passage to the chimney by a register door, the direction of the draft may be changed in such manner that the smoke and products of combustion are in part caused to pass down through the ignited fuel and between the bars, or through openings at the bottom of the grate, whilst at the same time a portion of the smoke and products of combustion still rise from the top of the fuel. The part which passes downwards through the fuel enters a chamber, which becomes heated partly by the products of combustion passing thus directly from the fire down with it, and partly by the heated fuel lying against the back of the grate which forms one of the walls of the chamber. The smoke and products of combustion which rise from the top of the fuel, are also caused to pass into the heated chamber before escaping to the chimney, in order that the smoke may in this chamber be consumed.

APPARATUS FOR MIXING AND MOULDING MATERIALS FOR THE MANUFACTURE OF FUEL, ... APPLICABLE TO MOULDING BRICKS AND OTHER ANALOGOUS ARTICLES. Dated May 4, 1858.—A communication.—*William Edward Newton*, Chancery-lane, London.—This invention relates to a former patent, dated March 20, 1858. The apparatus consists principally of, first, a mixing apparatus, and second, a moulding and pressing apparatus, whereby the ingredients, when intimately mixed, may be moulded into any convenient form.

BRICKS AND SLABS FOR PREVENTING DAMP IN THE WALLS OF HOUSES AND OTHER BUILDINGS. Dated May 10, 1858.—*William Charlton Forster*, Great Tower-street, London.—This invention consists in the production of a vitrified substance in the interior of bricks or slabs, where-

* This decision seems to us entirely in opposition to the requirements of the Act, as we will take an early opportunity to shew.—ED.

* Selected from the lists published in the *Engineer*.

by the out surfaces remain unglazed and adhesive, and the absorption of water or damp from the lower surface to the upper surface is prevented.

Books Received.

The Fairy Tales of Science: a Book for Youth. By JOHN CARGILL BROUGH. With Sixteen Illustrations by C. H. BENNETT. London: Griffith and Farran, St. Paul's Churchyard. 1859.

SCIENCE, perhaps, never was made more attractive and easy of entrance into the youthful and imaginative mind than in the form of these "Fairy Tales," which are excellent, both in idea and in execution. It is no light task to prepare a concise and readable account of the leading branches of science; but familiarly and ideally to play with them, as it were, and skilfully to intermix and amalgamate their often cold, harsh, and stern truths with the more palatable and youth-pleasing condiments of fancy, implies a still more grave and intimate acquaintance with their salient points than what is requisite in the preparation of a mere literal and matter-of-fact compendium, or compilation, from the heavier and more ponderous tomes of science.

The Fairy Tales open with "the age of monsters," introduced by a few sketches of the griffins and dragons of fairy mythology, between many of which, by the way, and the actual monsters of "once upon a time," there is a far closer resemblance than could have been originated by mere ideality—a resemblance which indicates something like a former personal human acquaintance with at least some stray remnants of the primitive ancients of the monster tribes, other than the mere alligators, crocodiles, boa-constrictors, whales, elephants, dodos, and others of more recent or modern ages.

"The amber spirit,"—the "fairy messenger," electricity,—is next taken in hand, and attractively treated of, as it should be; then the "four elements," the "life of an atom," and "modern alchemy." The "magic of the sunbeam" follows, and the kindred and stereoscopic truth, that "two eyes are better than one." There are various other chapters, equally interesting and as gracefully sketched; such as "the mermaid's home," "animated flowers," insect "metamorphoses," "water bewitched," in the state of steam and the spheroidal state; "a flight through space," on the modern wizard's broomstick—the telescope; "a tale of a comet," the infusorial, or "invisible world," the mining "Gnomes," and "Pluto's" volcanic kingdom, &c.

A better "new year's gift" to the young for 1859 probably has not appeared than these "Fairy Tales of Science."

We have before us a pile of books, to which early attention will be given. It includes, "The Arts connected with Architecture, illustrated by examples in central Italy, of Stained Glass, Fresco Ornament, Marble and Enamel Inlay, Wood Inlay, etc. from the Thirteenth to the Fifteenth Century," by J. B. Waring;—a very beautiful work, containing forty-one plates, executed in the highest style of Chromo-lithography, by Mr. Vincent Brooks;—"Original Unpublished Papers, illustrative of the Life of Sir Peter Paul Rubens, as an Artist and a Diplomatist;" collected and edited by W. Noël Sainsbury (of the State Paper Office). (Bradbury and Evans.);—A new edition of Wordsworth's "Greece," with a History of the Characteristics of Greek Art," by Mr. Scharf (Murray);—"Designs for Factory Furnace and other tall Chimney Shafts," by R. Rawlinson, C.E.;—"A History of the Knights of Malta," by Major Porter (Longman);—and "Painting Popularly Explained," by Thomas John Gullick, painter, and John Timbs, F.S.A., published by Kent and Co.

Miscellanea.

WEDGWOOD MEMORIAL.—The gentlemen who have recently taken up this matter contemplate, we hear, the erection of a suitable memorial *building*. The spot upon which Wedgwood was born is said to be attainable.

LONDON-BRIDGE.—A correspondent, "J. C." suggests, in order to aid the traffic over London-bridge, what has been proposed before in the case of Waterloo-bridge, namely, the formation of a road above it for foot passengers, on the principle of a ship's deck carried on columns; and that this should have a glass covering.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—The next ordinary general meeting of the session will be held on Monday evening, the 10th of January, when a paper will be read on the recent improvements in Paris by Mr. Edward I'Anson, fellow. An interesting series of photographs of the magnificent collection of classical marbles and terra cottas belonging to the Cavaliere Gio. Pietro Campana, hon. and corr. mem. will be exhibited.

THE LEICESTERSHIRE ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The second meeting of the Melton section of this society was held on Monday before last. The paper read was on "Melton and the Reformation," by Mr. James Thompson, of the *Leicester Chronicle*, who gleaned the particulars chiefly from an ancient box containing churchwardens' accounts, and other documents recently found in a cellar where it had lain for many years, the person occupying the premises thinking it or its contents of no value whatever. Upon opening this mysterious box, it was found to contain a great number of old papers, written in old court-hand. They were much tattered and very damp. After drying, and in some sort arranging them, they were placed in the hands of Mr. Thompson, whose knowledge of all such matters, and antiquarian taste, secured the paper based upon these town records, which Mr. Thompson read to the meeting, and which settled various questions as to the town lands, the ancient guilds to whom they originally belonged, the origin of the free grammar school, &c.

OPENING OF THE NEW MARKET-HALL, SMITHFIELD, MANCHESTER.—On the 23rd ult. the new market-hall, in connection with the covered market, in Smithfield, was formally opened. It is built of stone, and fronts Swan-street, Eagle-street, Goadsby-street, and Coop-street. There is an entrance from each street, the principal one being that in Goadsby-street. The style of architecture may be designated Roman composite. The principal front is divided into a centre recess and wings, the centre being formed by antæ, or pilasters, with moulded bases, and capitals of carved rams' and bulls' heads, interlaced with foliage. The pilasters support an entablature and pediment: the entablature extends completely round the building. The recesses are designed with semi-circular arches, and wrought in sunk stone-work. The cornice is surmounted by a low attic, or roof parapet. The Swan-street entrance is similar in design to that in Goadsby-street. The exterior dimensions are —length, 105 feet; width, 90 feet; interior, 77 feet by 60 feet; height, 44 feet. Internally, on each side, there are four shops, and in the central area twenty-eight stalls of ornamental workmanship; the whole of the latter being for butchers. A gallery 12 feet wide, formed over the shops, runs round the building, for the sale of jewellery, baskets, &c. The central portion of the roof is supported by sixteen iron columns, formed of decorated ribs of cast iron. These support lighter ribs which compose the framing of a lanthorn light, and also a sort of clerestory. The roof over the galleries has a continuance of sheet sky-lights 9 feet wide. The pendant gaslights were designed by the architects, Messrs. Holden and Son. The total cost of the building will be about 5,000*l*. Mr. S. Taylor was clerk ofworks.

SUBSTITUTE FOR RED LEAD.—An invention, based on the discovery and application of a certain earth or ochre, to which the name of Burgundy red has been given, has been patented for Messrs. Bouchard and Clavel, of Paris. This red ochre is very rich in silica and alumina, and is found on the estate of La Gruerie, in the Commune of Fontenouille, Canton of Charney, department of Youne, France; but as it is probable that ochre of the same or very similar quality may be found in other parts, the inventors wish to reserve to themselves the application of such earths or ochres in general to the preparation of the substitute for red lead. The composition of this ochre (Burgundy red) is:—Silica, 50·00 parts; oxide of iron, 14·50 parts; alumina, 26·60 parts; carbonate of lime, 7·60 parts; sulphate and phosphate of lime, magnesia, loss, 1·30 parts; = 100·00. A cement may be prepared with this earth which may be used with considerable advantage as a substitute for red lead in making the joints of boilers, water and gas pipes, and other joints, by mixing the said earth with grease, oil, lime, and with fragments of unburnt earthenware, Roman cement, and chalk in about the following proportions:—Burgundy red, 66 parts; grease or oil, 15 parts; lime, 11 parts; unburnt earthenware, chalk, or Roman cement, 8; = 100. This Burgundy red, or other analogous earth, may also be used very advantageously as a coating for preserving metal to prevent oxidation, by diluting it with volatile oil.

THE GLASSMAKERS' DISPUTES.—The disputes in the glass trade, between the journeyman makers and their employers, which have hitherto been confined to the district in and around Stourbridge, have at length made themselves felt in Birmingham. On Saturday last, according to the *Birmingham Post*, the men employed at some half-dozen or more of the largest firms in the borough received the customary notice of fourteen days, either to leave their employment or cease being members of "The Glassmakers' Union." The men have a fund of between 3,000*l*. and 4,000*l*.; and, in many instances, those in work are subscribing double contributions to the union.

LIVERPOOL BATHS AND WASH-HOUSES.—The quarterly returns of the superintendents of the various bath and wash-house establishments to the Baths Committee of the Liverpool Council show that at the Pierhead and Paul-street Baths there has been a slight falling off in the bathers; but at Cornwallis-street the bathers for the three months ending on the 24th November were 4,446 more than in the corresponding quarter of 1857, amounting in the whole to 31,988. Whilst there is a decrease in the number of female bathers at the Pierhead, there is an increase in the number of such bathers at the Cornwallis-street establishment, principally among women belonging to the industrial class. During the quarter, for all the baths, the number of visitors was 56,528. The wash-houses are beginning to be better appreciated, as is evident from the circumstance that the receipts for the Frederick-street establishlishment, which generally amounted to 8*l*. per week, reached during one week upwards of 12*l*.

HANLEY CEMETERY COMPETITION.—The local burial board, having selected six designs from those sent in, recommended that the council should name the prize designs. The council then devoted some time to the inspection of seven plans sent in; and, after some conversation, it was resolved that each councillor should write on a piece of paper the title of the design which he considered entitled to the first prize. This was accordingly done, and upon the papers being examined it was found that fifteen votes had been given for the design numbered 15 A, and bearing the label "Albion." Votes were then taken in a similar manner for the second prize, and it was found that thirteen councillors had recorded their votes in favour of the design No. 1, labelled "Fides." The corresponding envelopes were then opened, and it was found that the first prize had been gained by Messrs. Ward and Son, of Hanley, and the second by Messrs. Bellamy and Hardy, of Lincoln. It was then resolved that the two successful candidates be requested to furnish specifications and estimates for approval.

NEW PROCESS FOR FIXING CHALK DRAWINGS.—M. Ortlieb has just communicated a paper to the Academy of Sciences on this subject. The first methods for fixing works of art executed in chalks, charcoal, and other substances which are in danger of destruction from the slightest touch, date from very far back, and in some cases are perfectly successful. Sometimes the drawing is rapidly dipped into a bath of some glutinous liquid, and sometimes the liquid itself is applied with a brush. This, however, cannot be done with chalk or charcoal drawings. A very thin and transparent sheet of bibulous paper is laid on the drawing, and the brush is then passed over the protecting sheet; the glutinous liquid penetrates to the drawing, and the wished-for effect is produced. In the case of chalk drawings (pastels), however, this process has the inconvenience that certain tints, which, on being wetted, change their tone, do not return to their former state on drying. This circumstance led M. Ortlieb to make some experiments with a view to find a better fixing liquid than those now in use; and after many trials he found that the silicates of potash and soda answered very well, but with the serious drawback that during the application the colours were liable to be disturbed, so as to give the drawing the appearance of being "smudged." At length, however, he succeeded in obviating this inconvenience by a very simple plan, which merely consists in executing the pastel upon thick but unsized paper, such as is used in copperplate printing, and afterwards applying the fixing liquid to the back: it is thus quickly absorbed, without causing any disturbance of colours on the other side. To this it must be added, that none but mineral colours should be used, these being the only ones that can combine with the silicates, which have no action on vegetable colours. These rules being observed, the picture will not only resist damp, but will even resist washing with water: acid vapours have no effect upon it; and it becomes almost incombustible.

DAMAGE TO A CHURCH BY FIRE.—The fabric of St. Thomas's Church, Dudley, has been considerably injured by fire during divine service. The congregation were quietly dismissed, and the engines, luckily, were stationed only about fifty yards from the church, and were speedily on the spot with firemen. By this time the flames, originating, evidently, in the flue, were rapidly making their way up at the back of the church, and threatened to destroy the window, but the firemen mounted the roof and got them under. The corner of the structure, however, was completely burnt through.

PLANING MACHINE.—The Banff Saw-mill Company have set agoing, in their premises at the harbour, a machine for planing and jointing wood, at a cost of about 200*l*. The machine is driven from the same shaft as the saws. The planing machine is on the usual principles. It has a cast iron frame about 3½ feet in height and 12 feet in length. Four feeding rollers draw the deal into the machine end ways; and immediately after it enters, it passes over three planing irons in succession, which are set angularly, about four inches apart, with their edges upwards. The board is next caught by the irons which make the groove and feather on its edges. These are set in upright shafts, which revolve about 4000 times per minute. The next and concluding operation is the roller which revolves above the board, having two blades in it, which chip off whatever of the board is above the proper thickness. Thus prepared, deal after deal is thrown out—planed on one side, grooved and feathered, and all brought to one uniform thickness—ready for laying.

PROPOSED IMPROVEMENT AT HOLBORN AND SNOW HILLS.—Two large drawings have been hung up in the reading-room of the Corporation at the Guildhall, for the inspection of the members of the court and their friends. The proposal has been made by Mr. Marrable, the superintending architect of the Board of Works. The viaduct will cross the south end of Victoria-street, at a level of 23 feet above the lowest point of the valley, from whence, at a gradient of 1 in 50, the road will rise in continuation of Farringdon-street, to a point in Victoria-street on a level with halfway up the viaduct, from which point terrace roads will rise southwards, on either side, at a similar gradient, on to the high or level road extending from Hatton-garden to St. Sepulchre's Church, on Snow hill.

ELECTRO-TELEGRAPHIC PROGRESS. — A new great Ocean Telegraph Company has been established, for the purpose of connecting Great Britain with America, by means of Mr. Allen's system of submarine wires. The primary object is to establish a direct communication between London and New York by a line from the Land's End to Halifax. Hereafter, the company intimate that a line may be carried by Bermuda to Jamaica, and thence by connecting lines to the other West Indian Islands, the central states of America, and the Brazils. The weight per mile of the line proposed from Land's End to Halifax is only 10 cwt., while its specific gravity is as low as 1·35; just sufficient, it is estimated, to insure its sinking very slowly, without any strain upon the rope while being paid out from the ship. The mode of its construction is one large solid copper wire, or conductor, wound round closely with fine iron wire. This is enclosed in three thick coats of gutta percha, the whole being bound round with strands of tarred string. The *Times* advises the substitution of a number of very fine wires instead of one, so as to reduce the chances of a flaw in any one place destroying the whole line; and recommends the dispensing with the tarred string as unnecessary. To what end the iron wire is wound round the copper one, is not explained: would not a steel wire for the core and the copper warped round that be preferable if both are to be used? A strain which might break even the steel wire might thus fail to destroy *the conductor*, especially if a more elastic insulator surrounded it than one of gutta percha. We hope to see India rubber take its place yet, for this and other reasons to which we have already alluded.——Messrs. Newall and Co., have manufactured the cable for the Indian and Australian Submarine Telegraph, at the Birkenhead works, and it is now ready for shipment. Messrs. Newall purchased the screw steamships *Imperador*, *Imperatriz*, and *Bahiana*. for this peculiar service. The two former will receive about 1,000 miles each. In the forehold of each ship is a cylinder, made of iron plates, 31 feet in diameter and 14 feet in depth, which will receive one coil; in the after hold a cylinder 31 feet broad by 10 feet deep, which receives a second, and between the main and lower decks is a cylinder 28 feet in diameter by 4 feet 6 inches deep.

IMPROVEMENTS IN EDINBURGH.—The designs for the new street extending from the High-street, immediately opposite the Tron Church, to the south end of Waverley-bridge, have now been approved of by Sir William Gibson Craig, the referee under the Railway Access Company's Act, and are being exhibited to the public at present in George-street Hall. According to the *Scottish Free Press*, Messrs. Peddie and Kinnear, the architects to the Railway Access Company, have been very successful in complying with the requirements of the Act, which sets forth the desirableness of preserving as far as possible the character of the buildings in the district through which the new street is to run. About the middle of the northern side of the street it is proposed to erect a public hall, capable of holding about 600 persons.

TENDERS.

For rebuilding Wolstanton Church, Staffordshire. Messrs. Ward and Son, of Hanley, architects. Quantities supplied:—

Nelson, Liverpool	£2,755	0	0
Executors of T. and G. Hughes, Hinchley	2,743	0	0
Hughes, Liverpool	2,400	0	0
Yates, Liverpool	2,349	0	0
Pooley, Peterborough	2,185	0	0
Bryan, Stoke	2,170	0	0
Woolrich and Reece, Bursiem	2,000	13	4½
Reece, Burslem	1,984	0	0
Robinson and Son, Hyde (accepted)	1,858	0	0

For the erection of concert-room and commercial rooms to the Castle Hotel, Hastings. Mr. Henry Carpenter, architect:—

Jones	£962	5	0
Harman	955	10	0
Baker	945	15	0
Howell (accepted)	912	0	0

For bay windows to the front of the Castle Hotel, Hastings. Mr. Henry Carpenter, architect:—

Harman	£333	13	0
Jones	325	0	0
Howell	319	10	0
Baker (accepted)	296	10	0

For restoration of premises, No. 170, Fleet-street, City, destroyed by fire. Mr. Wm. Woolet, architect:—

Greig	£1,597	0	0
Reed and Son	1,490	0	0
Marsland	1,420	0	0
Downs	1,396	0	0
Brown and Robinson	1,377	0	0
Wood and Son	1,353	0	0
Wilson	1,339	0	0

For additions and alterations to Nos. 37 and 38, Jermyn-street, St. James's, for Mr. B. Rawlings. Mr. H. B. Richardson, architect. Quantities supplied by Messrs. Welch and Atkinson:—

Carter	£2,694	0	0
Higgs	2,610	0	0
Axford	2,590	0	0
Downs	2,494	0	0
Battenbury	2,438	0	0

For building the Albert Institution, Nos. 13 and 14, Gravel-lane, Southwark. Mr. J. W. Papworth, architect. Quantities not supplied:—

Child and Co.	£2,300	0	0
Stevens	1,550	0	0
Downs (accepted)	1,449	0	0

TO CORRESPONDENTS.

T. S. (when we see the view we will reply).—J. and M. D.—E. W. G.—T. P. H. (shall hear from us).—A Builder (bring in air to the fire by a pipe from the outside).—F. W.—Old Subscriber.—T. B.—J. H.—J. W. P.—F.—F. M.—T. G.—Je vous souhaite, &c.—J.—H. C.—Black Beetles (in type).

"BOOKS AND ADDRESSES."—We are forced to decline pointing out books or finding addresses.

☞ *NOTICE.—All Communications respecting Advertisements, Subscriptions, &c. should be addressed to "The Publisher of the Builder," No. 1, York-street, Covent-garden. All other Communications should be addressed to the "Editor," and* NOT *to the "Publisher."*

TO SUBSCRIBERS.

A coloured Title-page for the present volume may be obtained, gratuitously, on application at the Office. The Index will be given early in January.

The volume will be bound (on being sent to the Office), for 3s. 6d.; or Covers for that purpose may be obtained at 2s. 6d. each (broad), and 2s. (narrow).

It is necessary to state whether the Advertisements are or are not to be included in the bound volume.

The Publisher will feel obliged by Subscribers forwarding the amount of their Accounts to the end of 1858.

Post-office Orders and Remittances should be made payable to Mr. Morris R. Coleman.

ADVERTISEMENTS.

LETAROUILLY'S "ROME MODERNE." The Advertiser has obtained by mistake duplicate copies of sixty-six Plates, from 279 to 345, of the third volume, in perfect order, and would be glad to DISPOSE OF THEM cheaply to any one completing this work.—Address, W. S. Office of "The Builder."

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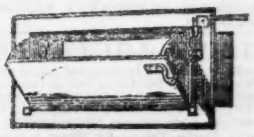

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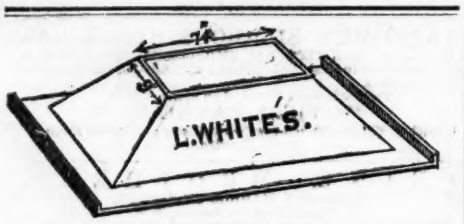

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